

GREENHOUSE PROJECT GROUP

PHASE TWO

FINAL REPORT

September 27, 2019

A project funded by the Office of Public Engagement at Memorial University

Faculty Sponsor: Dr. Atanu Sarker, School of Medicine

Project Supervisor: Kim Shipp, Memorial University Botanical Garden

Project Facilitator: Dan Rubin, Perfectly Perennial Herbs and Seeds

Project Coordinator: Etienne Chaytor, independent engineer

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Summary

With support from the Quick Start Fund of Memorial University, a project was undertaken to develop plans for an Earth Sheltered Greenhouse, as a demonstration structure to help generate food security and local food production in local communities.

The current round of funding has supported the second phase of this project, following up on design work completed by co-op students in the Faculty of Engineering and Applied Sciences. That work had resulted in detailed plans for a 240-square foot structure, partially buried in a hillside with a south facing transparent surface oriented to winter light. The students verified that the low cost of the structure (about \$4000 in materials), ease of construction and the fact that the resulting greenhouse could be heated year round to 10 degrees Celsius for less than \$500 in electrical heat, means that this design can have a potent impact on local food production and food security in our province and region.

This project was a partnership between Memorial University's Botanical Garden and Perfectly Perennial Herbs and Seeds (a social enterprise business dedicated to propagating locally acclimatized seeds). The faculty sponsor for this project, Dr. Atanu Sarkar of the School of Medicine, was particularly interested in exploring the potential for greenhouses to help address community health.

We convened a series of five meetings of local stakeholders and knowledgeable individuals to allow us to evaluate our design and gather insight and feedback on how to best apply our greenhouse design to achieve the goal of supporting local food production and food security. A list of twenty primary participants and a dozen advisors was contacted, and twenty-one of these individuals participated in our meetings.

These five sessions were remarkable for the degree of open collaboration, dialogue and creative criticism applied to the challenge of moving our greenhouse out into local communities as a "food hub." The meetings focused on a series of twenty-two research questions. With the help of project coordinator Etienne Chaytor and led by facilitator Dan Rubin, these meetings explored each of our research questions, and generated 270 specific findings and recommendations. In each meeting we also explored key policy issues that are affecting restoration of food security.

With these findings and recommendations in hand, we are now ready to proceed with construction of a demonstration version of the Earth Sheltered Greenhouse, in order to facilitate its implementation in rural and urban communities across our province. We have come to see the greenhouse as more than a single simple structure. It is, in fact, a "Swiss army knife" capable of growing food and boosting community health while helping communities develop socially and economically.

We have applied to the Public Engagement Accelerator Fund to construct a demonstration version of the greenhouse in 2020 and develop a communications hub to connect and support food security initiatives across the province. That funding has now been tentatively approved.

Background and History of the Project

Over a 14-week period, the managing director of Perfectly Perennial Herbs and Seeds worked collaboratively with two third-year engineering students from the Faculty of Engineering and Applied Sciences at Memorial University to develop a design for a medium-sized earth sheltered greenhouse. During a second co-op term, this design was further evolved, and all calculations checked to refine it for public presentation by a third co-op student.

The earth sheltered greenhouse is a structure adapted to cold climate sites that uses the earth as insulation, at the same time enhancing its structural stability and making it less obtrusive in the natural landscape. This design will allow communities in Newfoundland and Labrador, and other parts of the Atlantic Provinces, to extend the annual growing season by providing a sheltered space for plant propagation. In fact, the resulting design offers far more.

We have calculated that the resulting greenhouse, which can be built inexpensively with standard construction methods and materials, will create a grow space of up to 240 square feet suitable for year round food production.

The key points about this design are: it can be built simply and easily with readily accessible building supplies for a cost of approximately \$4000 in materials; it will provide year round shelter for food production and seed starting; it can be heated electrically for an annual cost estimated at \$500 or less, or operated off-grid with support from an alternate energy system. It may also be possible to heat the structure with air circulated through the ground or with direct solar energy stored in the thermal mass within the greenhouse.

This structure offers great promise for expanding local food production in rural communities in Eastern Canada, particularly in the challenging climate and short growing season of Newfoundland and the Atlantic Provinces.

In a meeting with staff of the MUN Botanical Garden, it was decided to continue developing the potential of this structure by convening a consulting group to advise on the addition of structural systems for heating, cooling, air flow and venting as well as the team needed to build and operate the structure, inputs needed to operate and maintain it, crops and value added products to be produced, and how to best fit the greenhouse into the local community.

With wonderful commitment and support from our faculty sponsor, Dr. Atanu Sarkar of the School of Medicine and Kim Shipp of the Botanical Garden and staff members Madonna Bishop and Tim Walsh, we were able to hold five meetings in the boardroom of the Botanical Gardens. The consulting group that we convened varied from meeting to meeting, depending on the topic that was the focus for each session. Professional engineer Etienne Chaytor volunteered to help coordinate and facilitate each meeting, contributing professional training and experience developed in previous projects he has supported as a process engineer.

Meeting Organization and Process

We developed a detailed list of topics and questions for our meetings to achieve the general goal of getting ready to construct a demonstration version of the earth sheltered greenhouse, but we also saw these meetings as a chance to examine provincial and local policies affecting local food production and food security in our province.

We wanted to take full advantage of the expertise we had gathered. We wanted to ensure that efforts to develop our greenhouse as a community “food hub” would be matched by attention to the larger context in which this effort was taking place. We understood that there is little chance of restoring food security in local communities if general issues, challenges and problems created by provincial and local policies and structures are not also addressed.

We therefore saw the group of advisors and participants we had gathered as a focus group that would be able to tackle difficult and complex aspects of public policy that are not being effectively questioned or examined publicly at this time.

Our meetings were structured to ensure that we would address a list of specific questions essential to effective implementation. The meetings were organized around four (later five) main aspects of our planning. The questions we addressed in each meeting were intended to give us detailed feedback and help us fit the greenhouse into the community where it would be built, maximizing the chances that it would be effective, sustainable and well matched with the real needs of each community.

The roles of project coordinator and meeting chair were differentiated to help us maintain progress during each meeting and move from question to question to cover the questions targeted in each session. This worked out really well. The meetings were very respectful and generated dialogue at a level that was impressive and effective. Each group managed to generate a series of interesting and unexpected insights into the challenges we face.

As one example of this, when we discussed the team needed to build and operate the structure, it became clear that the skills needed to construct the greenhouse might not be the same, nor involve the same individuals, as the team that would operate it. Another comment resulted in the reorganization of our meeting schedule: this was the insight that crops and products to be produced was a separate concern from the relationship of the project to the local community, which would involve political and social aspects quite different from fitting crop production to local food habits and markets.

At the beginning of each meeting, the project coordinator reviewed the structure of the meeting, using a slide show we had prepared as a visual aid. This allowed us to connect the five meetings to each other, since attendance at each meeting included a slightly different collection of individuals and expertise. During the meetings, we continued to use the slide show as a recording slate for the ideas and insights generated by the meeting. With this instant feedback and recording, we honoured the ideas of each participant, making them visible and organizing them for future reference. This set a tone of respect and generated a flow of sustained creative dialogue within each meeting.

Topics to be Examined

In this project we explored a range of topics and issues related to the construction and operation of an earth sheltered greenhouse. The questions we asked were organized around five topics, depending on whether they were associated with structural design, a team to build and operate the greenhouse, the inputs needed to run and maintain it, the crops and products to be produced, and how to build a positive relationship with the local community. In each meeting we also considered provincial and municipal policy issues that affect food production and food security.

The “flower” diagram below helped define the topics to be explored in our meetings and clarify their inter-relationships:

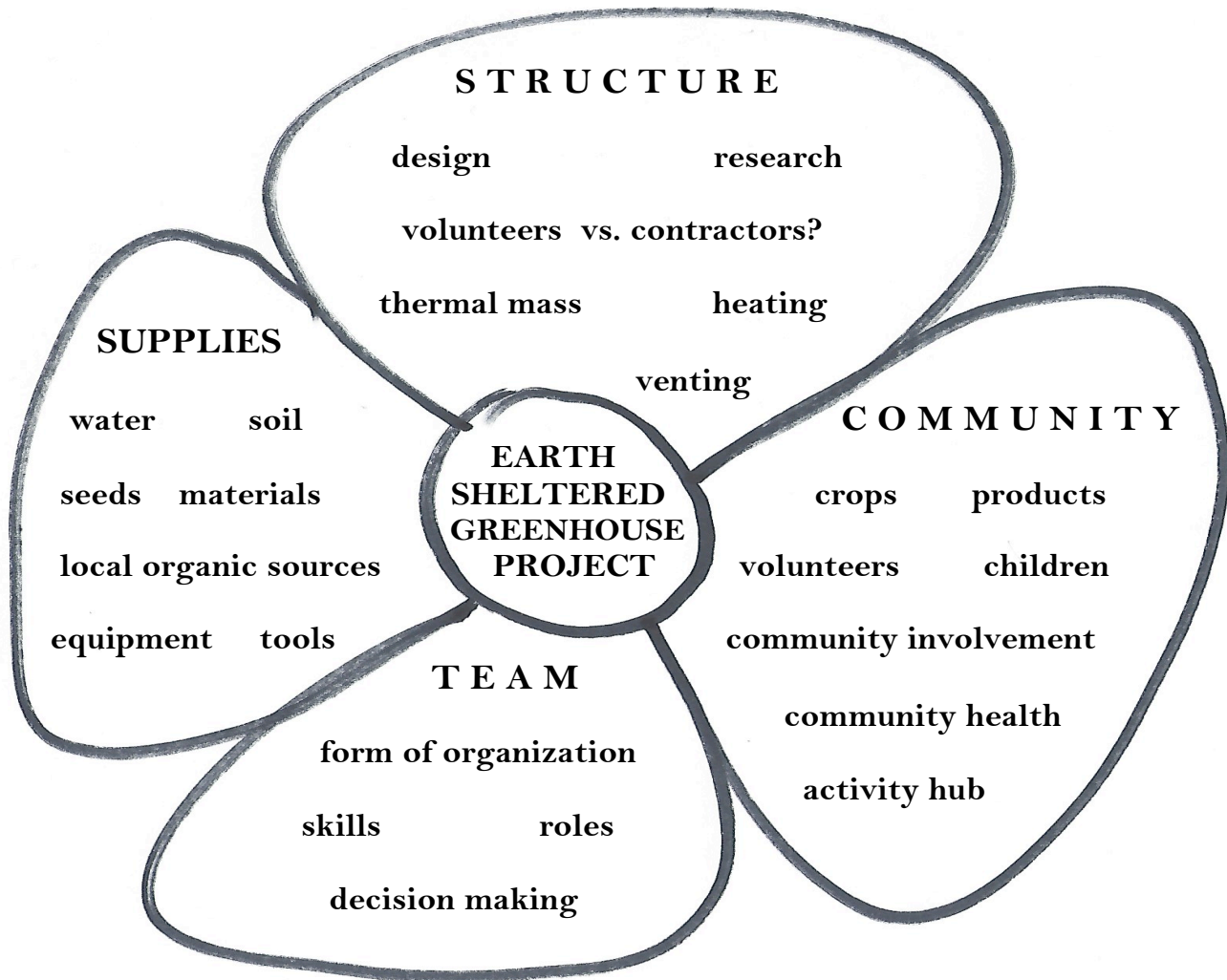


Figure One: Organizational Schema for Session Topics

Once our meetings were underway we realized that the lobe labeled COMMUNITY actually contained two critical components, one of which was the crops and products to be produced, while the second aspect is the complex and challenging relationship to the local community. Accordingly, we divided that area into two sessions and held five meetings (rather than the four originally planned) to more effectively focus on each aspect.

Meeting Topics and Research Questions

1. STRUCTURE - What building techniques, materials and systems do we need to build a successful Earth Sheltered Greenhouse?

A. **Structures** and material options for ease of building construction, strength and low cost?

Where and how are new food production sites being created?

B. How can the greenhouse become a **research** site with digital monitoring installed to provide data?

C. To what extent can the structure be built by **volunteers**, and should **contractors** be used?

How can these sites be better supported and supplied?

D. How can we maximize efficiency of **thermal mass** storage of sunlight and control of **light**?

E. What will be the most efficient ways to create **venting** of heat and moisture seasonally?

F. What form of winter **heating** should be used?

2. TEAM – What skills, attitudes and roles are essential to form a good working greenhouse team?

A. What is the best **form of organization** for a group to build and operate an Earth Sheltered Greenhouse?

What specific changes in local and provincial regulations are needed to generate food security?

B. What are the **key roles** to form a successful operating greenhouse team?

C. What **skills** or experience will be essential to the successful operation of the greenhouse?

D. What structures for group discussion and **decision making** will work best?

3. SUPPLIES – What specific materials and supplies will be needed to operate and maintain the Earth Sheltered Greenhouse?

A. What **supplies** will we need to keep the greenhouse productive year after year?

How can organic soil materials be made more available?

B. What are the best **local sources** for organic inputs, seeds, materials and tools?

C. Best design for **water** collection, storage and utilization for maximizing production?

How can we protect them from export out of NL?

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| | D. What equipment and tools will need to be replaced and maintained? | |
| 4. PRODUCTION – What crops and products will be best to grow to market and promote in the local community? | A. What are the best crops to grow to meet local needs? | How can food distribution and access be improved? |
| | B. What value-added products can be created along with food crops? | |
| | C. How can our crops and products help support health in the community? | What crops do we need to grow to improve food security? |
| | D. What strategies for packaging, marketing and distribution will work best? | |
| 5. COMMUNITY – How can we best serve local communities by growing food while building community involvement and support? | A. In what ways will location and community size change our planning? | How can local food production be regenerated? |
| | B. How will seniors and children be invited to participate as volunteers in running the greenhouse? | |
| | C. How can seniors and children benefit from the greenhouse? | How can we create a cultural hub for the community? |
| | D. How can the greenhouse become a hub for community activities ? | |
| | E. In what ways can the greenhouse help generate health in the community? | |

Figure Two: Summary of topics and issues for each of the meetings

Our meetings turned out to be highly effective in staying on track while addressing these specific questions, thanks to a high degree of organization and preparation by the project coordinator and careful attention to pacing and focus by the meeting facilitator.

In addition to dealing with each topic and question, we kept a running list of “Parking Lot” items that were important but not actually on topic, for further consideration in future meetings.

We emerged with clear answers to most of the questions we had posed, plus a list of additional topics and questions needing further exploration and discussion.

Project Participants

We originally identified 21 potential participants and 10 project advisors. We contacted all those individuals, requesting involvement in this project. We were fortunate to engage twenty-one individuals who participated actively in our consulting group.

Attendance at each session was based on the topic, with invitations and reminders sent out before each session. We also offered a telephone link to facilitate participation at a distance. This was used twice. As a result we had five well-attended meetings that became more and more effective as we sharpened our understanding of how to keep them focused and on track.

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| Dan Rubin – Manager, Perfectly Perennial Herbs and Seeds (Project Facilitator) |
| Etienne Chaytor - Engineer (Project Coordinator) |
| Kim Shipp - Director, MUN Botanical Garden (Project Supervisor) |
| Tim Walsh - MUN Botanical Garden |
| Madonna Bishop - MUN Botanical Garden |
| Dr. Atanu Sarkar , Associate professor of Medicine at MUN (Project Faculty Sponsor) |
| Tom Loader - Home gardener who works with the Organic Farm in Portugal Cove |
| Lori Heath - Common Ground Community Development, educational garden site in Pippy Park |
| Daphne March - Mi'kmaq educator and operator of the ShaMaSha Centre in George's Brook |
| Viviana Ramirez Luna - Provincial coordinator of Zero Waste NL |
| Diane Hollett - Owner/operator of Shell-Ex, turning marine waste and seaweed into fertilizer |
| Hannah Gaultois - MUN Centre for Social Enterprise |
| Shawn Dawson - Owner/operator of Barking Kettle, gardener and wild forager |
| Steve Gullage - Torbay community gardener and biologist |
| David Goodyear , Medical physicist building a passive solar house and greenhouse in Flatrock |
| Brian Yager - Garlic farmer and producer of Natural Gardener seaweed concentrate |
| Jane White - Crop advisor, NL Provincial Agri-foods |
| Toby Rowe - Sustainability Office, Memorial University |
| Dr. Ivan Emke - Grenfell Campus of Memorial University, focused on local food production |
| Sarah Crocker – Education Coordinator for Food First NL / Seed to Spoon |
| Marc Kielley - MUN Botanical Garden, cannabis production in our province |

Figure Three: List of Project Participants

The findings that follow are the direct result of the contributions of these individuals and are based on the experience, knowledge and openness that they brought to the five sessions. The result was a collection of 270 findings and recommendations that included detailed advice for successful implementation of our greenhouse design, recommendations for its effective application to food production in local communities (both urban and rural) and also identified issues and policies at the provincial level that are affecting how food is being produced and distributed.

We targeted those participants most appropriate for the topic to be explored. By doing this we were able to maximize the effectiveness of each session without burning out our participants. We are deeply indebted to the participants and appreciative of their contributions.

Summary of Project Findings

A detailed list of the 270 points recorded in our meetings may be found in Appendix A, which also identifies each finding as **essential**, *supporting*, or tangential to the topic under discussion, while Appendix B is our list of questions recommended for further discussion at future meetings.

FIRST MEETING – STRUCTURE

A. Structure and material options for construction ease, strength and low cost?

We considered a number of systems and structural options including various forms of insulation, glazing and venting as well as the optimum size for effective management and production. We also recognized the need to work with local zoning and regulations when planning the greenhouse. Finally, the need for a “header house” (a workspace for planting, potting and replanting) was identified, making it clear that our greenhouse needs to include this work space.

B. How can the greenhouse become a research site?

Earth heating was explored in this session, with suggestions that a HOBOT system (circulating warmth into the ground beneath or beside the structure and storing it there) might be effective. With the suggestion by Jane White that Greenhouse Canada is a source for monitoring systems for greenhouses, we realized we did not have to go back to our engineers to design these. We also noted that successful greenhouse operation requires a hands-on approach and active daily monitoring by those operating it. In each case, the greenhouse design will be based on what we are setting out to grow, which in turn will depend on the community’s needs and food habits. In general, there was strong interest in seeing the greenhouse as a research site to identify, test and confirm best practices in local food production.

C. To what extent can it be built by volunteers, and should contractors be used?

The key in answering this question will be the actual skills present in the community and in the group setting out to build the structure. In some places, well developed experience in concrete, framing, plumbing and electrical contracting will already be part of the local group, or available in the surrounding community. Volunteer contributions could therefore make a significant difference in terms of cost saving. However, in most cases, external expertise will be needed for one or more of the tasks required to build and equip the greenhouse. There are also existing groups, such as Iron and Earth, Choices for Youth and local groups that might contribute to construction of the greenhouse. It will be essential, when volunteers are involved, to recognize their work and provide them with tangible benefits (not necessarily financial) to compensate for their contributions to the project. Community involvement can take many forms and can help build confidence as a group moves toward the creation of a local food hub.

D. How can we maximize thermal mass storage of sunlight and control of light?

While we considered a number of options for thermal mass to store sunlight energy, there was not one principle or process that stood out as the best choice. Essentially, at each site and in each community, choices may be made that are different from other sites. Mechanical and low tech options are definitely to be considered to keep systems simple and easy to manage.

E. What will be the most efficient ways to create venting of heat and moisture?

To facilitate circulation of air through the structure, it will be important to utilize natural convection by placing cold air vents low down in the structure and hot air vents high up in end walls near the peak of the roof. In addition, installing fans for air movement and storage of warmth and moisture in underground repositories is possible. The HOBOS system currently under construction by David Goodyear for his new greenhouse in Flatrock is one example of what is possible in terms of combining venting with heat storage.

F. What form of winter heating should be used?

Winter heating is essential in any greenhouse used for year-round production, to take full advantage of delivering fresh vegetables have not travelled thousands of miles to get here. It was noted by Jane White that what makes our current project distinctive is the degree to which a more scientific approach to designing operating systems is taking place. These meetings are a great example of this. The goal of developing more local food production at the community level in Newfoundland and Labrador will require systems that allow us to produce food when day length is short and the temperature drops, making effective and efficient greenhouse structures essential here, as they are in Iceland, Holland and other cold climate areas. We discussed wood heat, fossil fuel fired burners, manure systems, ground heat capture and electrical heat as possible heating options.

POLICY ISSUES

Where and how are new food production sites being created? How can these be better supported and supplied?

While exploring these issues, we noted the expansion of community gardens (we currently have 90 of these in Newfoundland and Labrador, according to Sarah Crocker of Food First), and we also discussed greenhouses as a vector for community development, the issue of municipal zoning rules that make food production difficult or impossible in some places, and a general need to move from reliance on large scale agriculture and food importing toward more year-round production of food at the community level. Food distribution and marketing will also play a major role in changing the food system in our province.

PARKING LOT

In addition to the findings summarized above, we identified ground-air heat exchangers, venting systems, identification of a greenhouse site in Pippy Park, the need for public transportation between the various food production sites along Mt. Scio Road and the need to create a community volunteer potential assessment tool as topics for future discussion.

SECOND MEETING – TEAM

A. What is the best form of organization for a group to build and operate an Earth Sheltered Greenhouse?

In considering this general question we developed a great checklist of aspects to consider in forming or supporting the creation of a greenhouse team. It was suggested by our participants that the group needs to be small with shared decision making by those directly involved in the day-to-day operation of the greenhouse, rather than being run by a group of employees and directed by an external board. With this dedication to democratic management we saw the creation and operation of a community based greenhouse as most appropriately being organized as a social enterprise generating net income to support part time employment, while meeting a community's needs for a local food hub. By continually analyzing what works and what doesn't, the management of the project can be adapted and improved on an ongoing basis. While keeping educational and social benefits in view, it can do a better and better job of producing food that the community needs, while offering workshops, mentorships and contributing to community development. It will be important to avoid bureaucratic entanglement and maintain a clear sense of purpose and process.

B. What are the key roles for a successful operating greenhouse team?

We did a great job of identifying the key roles needed for success. By defining these roles it will be easier to ensure that the right people are involved. The key roles we saw were that of: an experienced gardener, hard workers, someone with a talent for face-to-face communication, a bookkeeper, someone to handle maintenance and repairs, and a person focused on research and data collection to monitor the operation of the greenhouse. We also saw the need for an individual to handle public relations and media and act as the public face of the project. Finally, we believe there will be a need for a designated person to look after fundraising, educational functions and who is competent in using social media and broadcast media to promote the work of the team.

C. What skills or experience will be essential to the successful construction & operation of the greenhouse?

Although similar to the list above, we more clearly defined the work to be done in building and operating the greenhouse. This list included the work of construction, community involvement and volunteer coordination, logistics and transportation of materials for construction and later for operation of the structure and shipping of products, development of garden space around and outside the greenhouse, structural maintenance and additions, and record keeping and financial accounting. Where all these aspects will come together is in the ongoing decision making that will be needed to evolve the project and keep it on track.

D. What group discussion/decision making structure will work best?

We discussed whether a board of directors would be needed, whether it would best to operate as a non-profit, a small business or a corporation, how commitment to the project can be developed and strengthened, how to best involve volunteers, the types of revenue sources to be considered as part of the operation and the advantages of operating as a "no guilt" structure. In each case, it was clear that best practices will likely emerge as the project proceeded.

POLICY ISSUES

What specific changes in local and provincial regulations are needed to make greenhouse projects possible across NL?

There have been a number of recent examples in our rural communities, of local misunderstanding and municipal regulations blocking our ability to grow food at home. Opposition to those keeping chickens, or trying to develop greenhouses and gardens has surfaced in Witless Bay, Corner Brook and Pouch Cove, among other places. Stories are also filtering in that show that some members of provincial AgriFoods are not tuned in to the need to develop and sustain local food production. So changes are needed at the provincial and municipal level to restore local food production to move our province back toward food security.

We identified NIMBY (not in my back yard) attitudes emerging out of the move toward suburban living and personal convenience as a major source of resistance to projects that could greatly benefit local communities, whether they be regional composting facilities, backyard chickens or food production on land currently zoned residential. We also noted that bureaucratic controls such as manure management permits, development permits and municipal zoning can create additional problems for food production initiatives.

Even though Newfoundlanders and Labradorians share a long history of producing their own food from fishing, hunting and gardening, the value of local food is obscured by the notion that food comes from stores. From the perspective of public health, it is clear that an epidemic of obesity, early onset diabetes and other health issues are resulting from our dependence on commercial products and processed foods and drinks. Food First has been targeting these aspects in their public programs, but demonstrating the direct connection between local food production and health can be a positive step in making this link more visible.

This is definitely an area where a community food hub could play a major role in public education.

PARKING LOT

We identified four concerns for further exploration and discussion: the value of social media as a communications motor for our project; the potential impact of a YouTube channel focused on the Earth Sheltered Greenhouse; the need for a provincial implementation and support team to help local groups develop a community food hub, and the value of providing access to gardens for health, social development and community building.

THIRD MEETING – SUPPLIES

A. What supplies will we need to keep a greenhouse productive year after year?

We identified a need for organic soil supplements, cover crops to restore and maintain soil fertility, composting to generate organic inputs from waste materials, free and recycled equipment including plant pots and garden tools, locally produced fertilizers, seaweed teas and soil testing as valuable components to keep our greenhouse and gardens productive over time.

B. What are the best local sources for organic inputs, seeds, materials and tools?

We are lucky to have Shell-Ex products and Brian Yager's Natural Gardener seaweed booster as excellent local sources for organic soil fertility that are produced here. We also recognized local sources for plant pots, seaweed from local beaches, manure from local farms, and local seed sources including Gaze Seeds. Based on previous experience, we were advised that mid-range tools (not too cheap, not too expensive) would offer the best value over time.

C. Best design for water collection, storage and utilization for maximizing production?

We need to gather knowledge about the minimum amount of water required for each crop. Agricultural water does not need to be potable, but water used to wash vegetables does need to meet more stringent purity requirements. For this reason, brushing off vegetables may be preferable to washing them. Food safety advisors from AgriFoods can provide advice on food safety procedures and regulations. Control of humidity in the greenhouse is essential for best growing conditions and to prevent mold and plant diseases.

D. What equipment/tools will need to be replaced or maintained?

We recognized the need for ongoing maintenance of all structures, the value of having a toolkit on site at all times, the fact that hand tools break, rust out, get lost and are sometime stolen, so they will need cleaning, maintenance and eventual replacement, that tools need sharpening and that a clear record of expenses for tool maintenance is essential. It is good to have eyes on to determine what maintenance is needed. A list of essential tools and recommendations for use, cleaning and storage will be part of the handbook that we plan to develop to support community greenhouse operation.

POLICY ISSUES

How can organic soil materials be made more available?

How can we protect them from export out of NL?

We explored various aspects of composting at the regional scale, including the need to keep agricultural compost free of plastics and other waste materials. Fish plant waste is an underutilized resource deserving more effective utilization. The identification, processing and protection from export of this valuable asset is needed, at the provincial government level.

PARKING LOT

We identified the book The Postage Stamp Garden as a source of information about organic soil enrichment. We hope to find a copy of this book.

FOURTH MEETING – CROPS AND PRODUCTS

A. What are the best crops to grow to meet local needs?

This will depend on whom you are growing for. In each community, local food habits and traditions will inform the selection of crops for the greenhouse operation. Traditional foods may be among the first to be produced, with an evolution toward new foods as education takes hold. In Newfoundland and Labrador, chefs have been leading the way in introduction of new foods and utilizing traditional foods to create new dishes. Selection of crops for greenhouse and field production should be oriented toward high return and early production, with high value crops such as herbs, fruits and out of season vegetables. Micro-greens, edible flowers and herbs were suggested as crops offering significant return for the space they require.

B. What value added products can be created as well as food crops?

Along with marketing produce, there is huge potential for saving and preserving what is grown to create value added products for sale and distribution. Such products can include dried herbs, teas, cut flowers, seeds, bedding plants, pickles, jams, jellies, preserves and meals in a jar. The greenhouse facility could create a community compost site, taking in household food wastes and processing these to generate bagged compost, to be sold back to local gardeners and growers. Workshops and educational visits can also become a value added aspect of operating a greenhouse. Winter growing and vegetable storage in root cellars can extend the market season.

C. How can our crops and products help support health in the community?

In addition to offering healthy food to the local community, the greenhouse can become a “food hub” hosting workshops in food preparation and preservation, gardening, healthy lifestyle and can help address three big issues in our food supply: affordability, accessibility and food choice.

Fresh local food is healthier and tastes better, since it has not travelled thousands of miles to get here, so simply by offering a local alternative, people can be weaned away from buying what they eat from a market that imports everything it sells. For families dependent on food banks, a local food production site can add healthy food to options for people with income challenges.

D. What forms of packaging, marketing and distribution will work best?

We recognized that most of the food we buy from commercial outlets comes wrapped in plastic. To get away from this highly polluting practice, we recommend using no packaging, or paper or other biodegradable materials for all distribution from our greenhouse and associated gardens. At present, the farmer’s markets in three urban communities are offering an alternative to the retail sale of produce, but even better will be local food production sites, with greenhouse and garden, where food can be purchased where it is grown.

Social media can help promote this, and changing food habits and tastes can help spur this change, with selection of crops moving from the familiar to the less known, over time. Public interest and awareness must be cultivated, along with the vegetables through innovative approaches such as U-pick crops, community supported agriculture (CSA - direct sales based on a subscription model) and other forms of social collaboration. We hope to support this process by creating a provincial information hub online, to promote local innovative food initiatives.

POLICY ISSUES

How can food distribution and access be improved?

What crops do we need to grow for local food security?

We see our greenhouse project as a “flagship” for sustainability and health, generating better access to healthy food for less wealthy families. For this to work, we will need to create a communications hub to promote the project and share information, and we will need better systems for distribution of food to meet the desire for local products once that expands. By doing this, we can also help restore a stronger sense of community, generate hope for a sustainable future and demonstrate the value of social enterprise as an economic and social development tool.

While we do have some sense of which crops to grow, a definitive list will emerge out of practice, as particular varieties of plants are shown to be the best to grow, offering high levels of food production and creating the greatest potential for sale through local markets. A necessary step is to remove, wherever possible, the middleman in the distribution system, to maximize the return to those who actually grow the food, and keep the cost affordable for consumers.

In general, this phase of our discussion generated questions, not answers, so it is an area deserving further dialogue and discussion.

FIFTH MEETING – COMMUNITY

A. In what ways will location and community size affect our planning?

We recognized that differences in age, gender and isolation will make each community unique in terms of its needs, patterns of health and access to food. In addition to the potential for marketing specific crops, food habits and traditions as well as local regulations will affect planning, construction and operation of the greenhouse. Volunteer potential will vary, as will access to water and electrical power, and the group operating each site will make their own decisions about the way in which they choose to construct, heat and plant the greenhouse they build. Urban and rural differences will strongly influence planning. In some location it may be possible to combine the greenhouse with an existing garden or incorporate it into plans for a community garden, farmer's market or café. Distance and travel costs will also have an impact on delivery of construction materials and marketing of crops once the greenhouse is operational.

B. How can seniors and children become actively involved in the greenhouse?

We already know of sites where a range of ages are becoming involved in community food production. In Baie Verte a hydroponic operation is being developed as a shared project joining a school and a seniors home. In Heart's Content, the seniors group has established a community garden in the town's former outdoor swimming pool, and that group sees their garden as a resource for the whole community. We acknowledged that the greenhouse project has potential to create a bridge between generations, while creating opportunities for social inclusion and generational knowledge exchange. A project can involve the community by organizing seasonal activities and celebrations, demonstrating healthy lifestyle choices and honouring local heritage. Children can become cooks and teach their parents about healthy eating in workshops focused on food preparation and preservation. The greenhouse could run a summer camp to involve children directly in food production. There are many possibilities based on these themes.

C. How can the greenhouse become a hub for community activities?

Community composting, educational programs, skill training and mentorships, a café and gathering place, school programs and seasonal employment are all possible once the greenhouse is in operation. By adding a covered seating area with a picnic table, people will be encouraged to visit the site, and this will help the project to be seen as a local community hub.

The general idea behind a "food hub" is to gather community around the theme of food. The greenhouse can become the centre for a larger complex, along with a community garden, a farmer's market and a café, as these elements expand outward to include the wider community in a positive way. The best way to achieve this may be to move slowly, building momentum and gathering trust and volunteers as each step suggests the next.

D. In what ways can the greenhouse help generate health in the community?

The greenhouse can help transform local diets, provide bedding plants for local gardens, offer workshops focused on food, health and cooking, herbs and healing and help retain and restore local food traditions. It could invite residents in the area to form a food security committee, to work with the greenhouse to assess and then address local food needs. As this process unfolds, it will help restore pride in the community and connect people with each other in new ways.

POLICY ISSUES

How can local food production be re-generated ?

How can we create cultural hubs for local communities?

We see the need for some type of survey or research to establish how much food and what kinds of food are being produced across this province at the community level. The creation of community gardens and farmer's markets is a step in the right direction. It was noted that community gardens are now encouraged and allowed anywhere in St. John's based on a decision by this city's councilors. On a wider scale, some significant changes are needed in local policies to support the movement toward local food production. Local seed events and farm festivals can help spread awareness as well as promoting the sharing of knowledge, seeds and agricultural techniques. We need to go to where people already buy their food and introduce the idea of local growers being present at least one day a week to direct market their crops. Everyone has a role to play in changing our food system to make it more healthy and sustainable. It was pointed out that government funders prefer to deal with corporate entities because they believe that "business" is more reliable than non-profit groups. This is one reason why social enterprise, organized as a business but focused on social and environmental good, offers a useful mid-ground.

PARKING LOT

We noted that Plantify, a project based in Marystown, and recently documented by CBC, is an effort to address health issues by promoting a plant based diet. Also encouraging is the recent documentation by Food First of the ninety community gardens that have been established across the province, with a list that can be accessed online at healthyeatingnl.ca. In the work that we do we will need to deal with building codes that may require additional facilities (as exemplified by the requirement that the large passive solar greenhouse currently under construction at the Autism Centre have a sanitary sewer, even though it has no bathroom in the structure.) There may also be limits on lighting at night placed by local regulations or requirements.

This concludes our summary of the general findings that resulted from our meetings.

Results of this Project

This project has achieved our principal goal of preparing us to construct, equip and create a team to operate the earth sheltered greenhouse here in St. John's. At present we hope to be able to involve immigrant farmers to form a group for this. We have applied to the Office of Public Engagement at Memorial University for funding to create the greenhouse and funding for the next phase has already been conditionally approved.

In our five meetings we addressed the main issues and topics most essential to successful implementation of our plan to build an earth sheltered greenhouse in Pippy Park, as a demonstration structure to inspire similar projects across the province.

By carefully organizing and planning for four sessions (which expanded to become five meetings) and by offering an instant, visual recording medium to ensure that their ideas were recognized and recorded, we drew from our participants a very high level of involvement, enthusiasm and collaboration. We gathered 270 suggestions, questions and recommendations for further study.

Some of our questions were answered in great detail. Others were not. As a result we emerged not only with our main findings, but also with a list of more than twenty topics for further discussion and exploration.

Our meetings recognized the need for support to enable local communities to create their own community "food hubs." We have identified two additional sites, both of which are currently being developed as food production and education sites. One of these is a market garden located in Avondale. The second is a similar project in Port Blandford. In both places, couples are well underway in building their sites, with small greenhouses and raised beds in place, and detailed plans for growing and marketing local food, and inviting children and families to participate in educational programs at their sites.

Our meetings identified a need for a provincial communications hub to connect sites where groups are well underway with local food production, and to support new groups that will move in this direction in the near future. We plan to use part of the next round of funding from the Office of Public Engagement to create an online information hub, and to convene a professional consulting group to offer assistance, answer queries and do research to facilitate the creation of local food production sites across the province.

None of this could have happened without the active support of our participants. Their commitment and involvement extended a vote of confidence in the project, and their presence allowed us to explore the issues that affect our project. Our meetings have strengthened the network of our local food community. In these meetings we affirmed our shared commitment to the health, sustainability and vitality of the communities in our province by focusing on how to improve local food production.

We know there is a lot more to be done to realize the full potential of a greenhouse that is more than a building. We now see the Earth Sheltered Greenhouse as a "Swiss army knife," a tool with many blades, available to help rebuild local food production and generate community health by offering a unique collection of tools and options to any community where a small group would like to tackle these issues.

Appendix A: Findings from Meetings of the Greenhouse Project Group
[each item is coded to indicate whether it is **primary**, supporting, *tangential* and/or needs another meeting]

FIRST MEETING NOTES

A. Structures and material options for construction ease, strength and low cost?

- 1.a.1 - Keep all sides insulated except perhaps east wall with some glazing, not too much insulation (DAVID)
- 1.a.2 - Overall square footage is small, so move office to back wall? (SARAH)
- 1.a.3 - Good venting is really important, one example is already built – a similar structure in Halifax (SARAH)
- 1.a.4 - We will need a “header house” – a workspace for plant preparation, potting, etc. perhaps instead of an office (Jane)
- 1.a.5** - Building code/health code/fire code - essential to obtain permits based on local rules (JANE)

B. How can the greenhouse become a research site?

- 1.b.1** - Heat retention versus venting [should be moved to become **item 1.a.6**]
- 1.b.2 - Synergy between structural design and what you grow
- 1.b.3 - HOB0 heating system (control of moisture, humidity, air temperature) (DAVID)
- 1.b.4** - Greenhouse Canada has a source for digital monitoring systems, background information is already available, rather than having engineering students “reinvent the wheel”
- 1.b.5 - Still need daily human presence to monitor changes, system issues or breakdowns and entrance of pests or diseases
- 1.b.6 - Ground-heat exchanger would be a major heating option to explore [item should be moved to become 1.f.8]
- 1.b.7 - Earth-tube system to be explored as a low energy input heating option
- 1.b.8 - What are the unanswered questions we want to answer?

C. To what extent can the structure be built by volunteers, and should contractors be used?

- 1.c.1** - Contractors may be needed for excavation, concrete work, etc. but in some cases if we have expertise we can rent machines and do it
- 1.c.2 - Calculate volunteer labour in hours and compare to contractor cost; we need to be able to sell the idea to a larger community so their involvement could be a very positive step during construction
- 1.c.3 - Each community is really different in what they can offer in volunteers
- 1.c.4** - Volunteer management is an essential job; we need a coordinator for that. Return on investment for volunteers should be considered: how will they be compensated/supported? (Food? Salad bar? Part of a small farmer’s market?)
- 1.c.5 - The local social enterprise construction company Choices for Youth could help with construction
- 1.c.6 - We will need an engineer to make sure the building is safe and well-built Permits may be required depending on the location. Building codes will affect the construction.
- 1.c.7 – How we proceed depends on the community’s location (availability of food, local education function, transportation)
- 1.c.8 - Knowledge & tools is one thing, but labour is another factor Communicate other benefits than money to community and volunteers
- 1.c.9** - Tie-ins to community resources, choices and skills is important

D. How can we maximize efficiency of thermal mass storage of sunlight and control of light?

- 1.d.1 - Potential for ground storage and retrieval of heat with fan and ground loop pipe (4-8 inch diameter) (DAVID)
- 1.d.2 - Water as heat storage medium?
- 1.d.3 - Rock pit for seasonal heat storage (used in Earthships for heating/cooling)
- 1.d.4 - Window shades automatically operated to block some light in summer?
- 1.d.5 - Summer vs. winter sun angle related to roof design
- 1.d.6 - Sun vs. cloud - how does the building respond?

E. What will be the most efficient ways to create venting of heat and moisture?

- 1.e.1 - 25% of floor area recommended for area of passive venting
- 1.e.2** - Circle principle - moving air passively and actively through space
- 1.e.3 - Heat exchange to conserve energy during colder months
- 1.e.4 - Venting heat and moisture essential during warm months
- 1.e.5** - Combine passive air movement with low energy fans at vents
- 1.e.6** - Storing vs. venting heat
- 1.e.7 - HOBAS heat exchange system installed by DAVID in his home in Flatrock

F. What form of winter heating should be used?

- 1.f.1 - Heat pump doesn't work effectively below 10 degrees C (DAVID)
- 1.f.2 - A small wood stove might overheat the building
- 1.f.3 - Forms of heating may be limited by building permit requirements
- 1.f.4 - Efficient return on energy for heating is important (DAVID)
- 1.f.5** - Many possible heat options: solar, electric, compost, ground heat
- 1.f.6 - Each site may have a different heating/cooling system
- 1.f.7 - Summer cooling/venting a major issue
- 1.f.8 - Ground-heat exchanger would be a major heating option to explore *[item moved from 1.b.6]*

POLICY ISSUES

Where and how are new food production sites being created? How can these be better supported and supplied?

1.Pol.1 - Community gardens are expanding, greenhouse development is slower here, our project takes a more scientific approach than many

1.Pol.2 - Zoning can affect whether residents can grow food, raise animals

1.Pol.3 - Greenhouse can be a vector of change, community health

1.Pol.4 - Food heritage is an important part of what we grow and eat

1.Pol.5 - Traditions & access to healthy food are interrelated

1.Pol.6 - Affordability of the food and accessibility in rural communities

1.Pol.7 - We need to move from commercial agriculture to people feeding themselves with food grown locally

1.Pol.8 - Food production and distribution needs to be better distributed

Parking Lot

1.Par.1 - Ground to Air Heat Exchanger, not a heat pump would be best (DAVID)

1.Par.2 - Venting - air exchanger too high volume of exchange (DAVID)

1.Par.3 - Data on heat storage/tables “Greenhouses for homeowners + gardeners” available online from government: documents to check are NRAES-137, NRAES-33, NRAES- 3

1.Par.4 - Need systems that are efficient and sized to use just what you need (DAVID)

1.Par.5 - Add research site question to our upcoming Community session

1.Par.6 - Public transportation along Mt Scio Road an important issue for our site.

1.Par.7 - Ask Tom about in-floor heating: how it works, efficiency, installation

1.Par.8 - Develop a quick community volunteer assessment process for each site

SECOND MEETING NOTES

A. What is the best form of organization for a group to build and operate an Earth Sheltered Greenhouse?

- 2.a.1 - Small group
- 2.a.2 - Shared decision-making
- 2.a.3 - Company or non-profit? or both?
- 2.a.4 - Avoid bureaucracy
- 2.a.5 - Decisions made by people who do the actual work
- 2.a.6 - Profit making but not to generate net profit
- 2.a.7 - Structure will continue to evolve and develop
- 2.a.8 - Constantly thinking of ways to improve structure
- 2.a.9 - Keep educational and social benefits always in sight

[* This list offers a great checklist for local team building]

B. What are the key roles to form a successful operating greenhouse team?

- 2.b.1 - Experienced gardeners
- 2.b.2 - Strong backs *[should be moved to 2.c]*
- 2.b.3 - Social skills, community relations
- 2.b.4 - Bookkeeping
- 2.b.5 - Maintenance and repairs
- 2.b.6 - Researcher, data collection and analysis
- 2.b.7 - Facilitator or Leader? - the Public Face of the group/spokesperson
- 2.b.8 - Communication \- Fundraising, Educational tours, best practices sharing, expertise in social media, print promotion

C. What skills or experience will be essential to the successful construction & operation of the Greenhouse?

- 2.c.1 - Experienced gardeners, people good at growing, at least one person with these skills.
- 2.c.2 - Construction team - same or different from operating team?
- 2.c.3 - Site preparation (Excavation expertise, concrete, plumbing, framing, electrical, heating, venting, controls, landscaping)
- 2.c.4 - Involve the local community; communicate the next steps to the community so they feel involved, consulted
- 2.c.5 - Flexibility on construction techniques (build with local rock and other materials for example, rather than concrete?)
- 2.c.6 - Minimum team to facilitate construction, internal or external
- 2.c.7 - Logistics of transporting & assembling material
- 2.c.8 - Operating team: data collection expert, someone that can coordinate the activities/planning, educator, communicator *[should move this item to 2.b]*
- 2.c.9 - Garden space outside the greenhouse, could be paired with a community garden for seed starting, protected crops
- 2.c.10 - Connect with local heritage and food traditions

- 2.c.11 - Excellent social connections and skills needed
- 2.c.12 - Structural maintenance will be an ongoing responsibility
- 2.c.13 - Bookkeeping, keeping track of what works: internal or external? *[move this item to 2.b]*

D. What group discussion/decision making structure will work best?

- 2.d.1 - Board of directors needed or not?
- 2.d.2 - Make decisions consensually or top down?
- 2.d.3 - Committed people, community oriented, gardening interest, without any private agenda
- 2.d.4 - Social enterprise model
- 2.d.5 - Greenhouse on public or private land?
- 2.d.6 - Legal status to apply for grants, building permits, municipal support
- 2.d.7 - Revenue model - Student employment, food product, bedding plants, seasonal activities, lost skills, heritage renewal
- 2.d.8** - Decisions should be made by people who are doing the day to day work (basic principle of democratic management)
- 2.d.9 - Employ volunteers for specific garden tasks
- 2.d.10 - Mentoring opportunities
- 2.d.11 - No guilt environment

POLICY ISSUES

What changes in local and provincial regulations are needed to make greenhouse projects possible across NL?

- 2.Pol.1 - NIMBY attitude
- 2.Pol.2 - Clear organization and presentation, with neighbourhood impact
- 2.Pol.3 - Develop and explain community benefits for children, seniors, mental health
- 2.Pol.4 - Manure management permits (Tom)
- 2.Pol.5 - Media outreach to help generate support (with MUN sponsorship)
- 2.Pol.6 - Accessibility gardens, connecting with public and supportive social values

Parking Lot

- 2.Par.1** - Social media as a communication motor
- 2.Par.2 - YouTube channel dedicated to the Earth Sheltered Greenhouse
- 2.Par.3 - Core team to support scattered greenhouse project sites
- 2.Par.4 - Video the process of building, equipping our pilot greenhouse.

THIRD MEETING NOTES

A. What supplies will we need to keep a greenhouse productive year after year?

- 3.a.1** - Soil supplies: make up mix for pots, for in-ground growth, create a triple mix - a third each of compost, sand and original soil
- 3.a.2 - Cover crops can be used to maintain fertility
- 3.a.3 - Composting facility as part of the setup?
- 3.a.4 - Need to monitor quality of inputs from off-site (no garbage, contaminants, imported materials)
- 3.a.5 - Soil amendments can be an opportunity for community connection
- 3.a.6** - Use free/recycled/reusable pots or containers
- 3.a.7** - Liquid fertilizers preferred, compost teas, weed teas
- 3.a.8 - Seaweed teas can be made - harvest, triple washed and water composted
- 3.a.9** - pH testing and control as needed (lime), less needed if soil ecology is healthy

B. What are the best local sources for organic inputs, seeds, materials and tools?

- 3.b.1** - Buy plant pots of standard size - 4 inches (available from Eastchem)
- 3.b.2** - ACORN-NL has a fertility input list that will be updated (Jane)
- 3.b.3** - Seaweed from local beaches
- 3.b.4 - Micronutrients essential
- 3.b.5 - $\frac{1}{3}$, $\frac{1}{3}$, $\frac{1}{3}$ release of macronutrients over 3 years from organic sources
- 3.b.6** - Always good to have a liquid fertilizer addition
- 3.b.7 - Soil testing a good idea
- 3.b.8** - Gaze Seeds, regional seed companies, 90 seed houses across Canada, Seeds of Diversity
- 3.b.9** - Local seed producers
- 3.b.10** - For best quality affordable tools you should buy in the middle between low and high end sources
- 3.b.11** - Local manure – can be sourced through personal contacts, pelleted manure can be imported

C. Best design for water collection, storage and utilization for maximizing production?

- 3.c.1 - Need to research water requirements related to growing area
- 3.c.2 - Agricultural water does not need to be potable, rinse water does
- 3.c.3 - Brush rather than wash to maintain food quality (Jane)
- 3.c.4 - Overhead irrigation must be clean water, drip irrigation does not have to be
- 3.c.5 - Food safety people (Agri-Foods) can advise on chlorination
- 3.c.6 - If you have access to chlorinated municipal water, use it
- 3.c.7 - Spinach, leafy greens, onions need to be concerned about food safety
- 3.c.8 - Minimum water usage per crops are available (*can refer this question to Jane White of AgriFoods*)
- 3.c.9 - Humidity maintenance and control is important for optimum growing conditions, cooling in hot weather

D. What equipment/tools will need to be replaced or maintained?

- 3.d.1** - Ongoing maintenance of structure will be needed
- 3.d.2** - Toolkit on site and person tasked with inspection and maintenance
- 3.d.3** - Hand tools break, rust out, get lost, get taken, loaned and not returned
- 3.d.4** - Tool cleaning and storage - define storage area, cleaning routine
- 3.d.5 - Sharpen tools
- 3.d.6** - Make a list of basic supplies and tools for first year operation *[include this in our handbook for site development]*
- 3.d.7 - Record materials, expenses and time for maintenance as part of ongoing record keeping
- 3.d.8 - Eyes on, hands on always needed

POLICY ISSUES

How can organic soil materials be made more available? How can we protect them from export out of NL?

- 3.Pol.1 - NIMBY stopping regional compost facilities from being built
- 3.Pol.2 - Agricultural producers want “high end” compost free of waste material
- 3.Pol.3 - Canada Composting guidelines (Feeds and Fertilizers Act) for selling compost or fertilizers (Canada Environment) is a lot of work
- 3.Pol.4** - Fish plants waste still being dumped could be utilized but it's privately owned
- 3.Pol.5** - Cost of shipping will make utilization of local resources attractive
- 3.Pol.6 - Carews bought the recipe for Pisces marine compost (local pilot project) on the Bonavista peninsula
- 3.Pol.7** - Should become a locally regulated and protected provincial resource

Parking Lot

- 3.Par.1 – Obtain a copy of The Postage Stamp Garden - Double digging, organic enrichment

FOURTH MEETING NOTES

A. What are the best crops to grow to meet local needs?

- 4.a.1 – It all depends on who you are growing for
- 4.a.2 - Farmers market crops OR traditional food
- 4.a.3 - Greenhouse can provide the core for a larger garden
- 4.a.4** - Bedding plants, starters (tomatoes, cucumbers, etc.)
- 4.a.5 - Special species that are trending now? ex : Broccoli or celery, mushrooms
- 4.a.6 - Introduction of new crops / education
- 4.a.7** - Crops for restaurant sale
- 4.a.8** - Crops to meet the need for promoting and celebrating cultural diversity
- 4.a.9** - Herbs, medicinal plants and basil
- 4.a.10** - Micro-greens can be repeatedly harvested
- 4.a.11 - What to grow in the greenhouse versus outside
- 4.a.12 - Traditional food mainly appreciated beyond the overpass?

B. What value added products can be created as well as food crops?

- 4.b.1** - Dried herbs
- 4.b.2** - Cut flowers (edibles and decorative cut flowers) could create a profitable hook and pull people in
- 4.b.3** - Seeds
- 4.b.4** - Bedding plants
- 4.b.5** - Compost (also think about compost in the design, to replace insulation?)
- 4.b.6** - Pickles and preserves
- 4.b.7** - Tomatoes, peppers, cucumbers, eggplant, basil, other herbs
- 4.b.8 - Winter growing (anything fresh), a huge advantage for marketing
- 4.b.9 - Education and awareness workshop
- 4.b.10** - Meals in a jar
- 4.b.11** - Jam, jellies and preserved (acid foods)

C. How can our crops and products help support health in the community?

- 4.c.1** - Producing organic healthy food
- 4.c.2** - Changing eating habits
- 4.c.3** - Corner stores could sell healthy vegetables
- 4.c.4** - Food banks provide substandard packaged food - that could be changed
- 4.c.5 - Fresh food is healthier and tastes better
- 4.c.6 - Certification process to label crops as “NL fresh” to provide food for the food banks?
- 4.c.7** - Sustainability to be achieved through non-profit status?

4.c.8 - Three big challenges: affordability, accessibility and food habits

D. What forms of packaging, marketing and distribution will work best?

4.d.1 - Local food culture is changing

4.d.2 - Sustainability of the project is crucial

4.d.3 - Public interest and promotion are essentials

4.d.4 - Initial crops selection that would sell well at first and then transition to more exotic crops?

4.d.5 - Greenhouse next to where you sell products?

4.d.6 - Social Media essential to community awareness

4.d.7 - How can we develop a collaborative project connecting all growers? *(The local food community is strong in NL)*

4.d.8 - We need a hub for information and collaboration in growing and gardening to support local food production

4.d.9 - The farmers market is currently the connection point for growers

4.d.10 – U-pick concept but with vegetables not fruit, in a greenhouse

POLICY ISSUES

**How can food distribution and access be improved?
What crops do we need to grow for local food security?**

4.Pol.1 - How can the greenhouse become a flagship for sustainability and health

4.Pol.2 - How can we better create accessibility to healthy food for less wealthy people

4.Pol.3 - Need for a communication/information hub for food production

4.Pol.4 - We need better production and distribution for locally grown healthy food

4.Pol.5 - We need to work to restore a deeper sense of community

4.Pol.6 - Is there a significant role in improving food access to be played by a social enterprise?

4.Pol.7 – We need a meeting focused on food storage, distribution and access.

[Our meeting generated these questions, but did not deliver answers, so more discussion is needed on these issues.]

FIFTH MEETING NOTES

A. In what ways will location and community size affect our planning?

- 5.a.1** - Demographics (age, gender, background, isolation)
- 5.a.2 - Associated travel cost for products and inputs
- 5.a.3** - Local marketing potential
- 5.a.4** - Access to transportation of building materials
- 5.a.5** - Access to organic inputs
- 5.a.6** - Community ownership (hosting, commitment, level of trust, find community leaders)
- 5.a.7 - Urban versus rural challenges
- 5.a.8 - Depends on what the community already do, ex. Community gardens
- 5.a.9 - Business model will depend on many factors
- 5.a.10 - Education, presence of students willing to learn
- 5.a.11 - Local grocery store are buying local gardeners products
- 5.a.12** - Legal requirements (zoning, ownership, permit structure, security on the site)
- 5.a.13** - Location aspects : Visible in the community, central, a sunny, level spot
- 5.a.14** - Access to electricity and water
- 5.a.15** - Group of volunteers willing to participate even in the design phase
- 5.a.16** - Grocery stores and larger outlets to market produce
- 5.a.17** - Local gardeners and market gardeners interested in annual bedding plants
- 5.a.18 - Capacity and scale, technology transfer, create a good example *[a broad area that needs further discussion]*

B. How can seniors and children be actively involved in the greenhouse?

- 5.b.1 - A collective entrepreneurship in Baie Verte is developing a shared hydroponic system (where two buildings with children in school and seniors in a housing complex are located near each other)
- 5.b.2** - Proximity is important to connect the various aspects and groups
- 5.b.3** - Make it inviting, inter-generationally accessible, equip the site with a public bathroom
- 5.b.4** - We need an evaluation tool to assess the community (local politics, opportunity for a little community boost)
- 5.b.5** - Social inclusion, knowledge exchange
- 5.b.6 - Modeling lifestyle options
- 5.b.7** - Seasonal activities and events
- 5.b.8** - U-pick options for families
- 5.b.9** - Cooking, preparing, preserving food, also demonstration workshop
- 5.b.10** - Get to the parents through the kids and grandparents
- 5.b.11** - Kids cook, parents taste, chefs teach
- 5.b.12** - Promotion of heritage varieties

C. How can the greenhouse become a hub for community activities?

- 5.c.1** - Local / regional composting
- 5.c.2** - Educational and research possibilities
- 5.c.3 - Form and function need to be adapted to the local community
- 5.c.4** - Skill training
- 5.c.5** – Build an outdoor eating area with shade/rain shelter and a picnic table
- 5.c.6** – Café adjacent to greenhouse and garden, to turn crops into prepared food, demonstrate food choices, new foods
- 5.c.7 - School programs to be developed
- 5.c.8 - Project community animated
- 5.c.9** - “It will only last so long” based on volunteers, eventually need to pay someone
- 5.c.10** - Build a plan for employment
- 5.c.11** - Gardening camp, workshops with school children and parents
- 5.c.12** - Connect with food bank
- 5.c.13** - Can be combined with a community garden, a farmer’s market and/or a cafe

D. In what ways can the greenhouse help generate health in the community?

- 5.d.1** – Workshops on gardening, health, food, lifestyle, food preserving, root cellars, etc.
- 5.d.2** - Bedding plants to support home gardeners
- 5.d.3 - Restore community pride
- 5.d.4 - Connection with food
- 5.d.5 - Local food is better
- 5.d.6** - Restoring traditional methods of growing
- 5.d.7** - Improve local diets
- 5.d.8** - Changing food habits
- 5.d.9** - Local food security committee
- 5.d.10 – We need an evaluation tool to take a look at regional and cultural food habits differences
- 5.d.11** - Bring natural exercise back into the lifestyle
- 5.d.12 - How much food can a small greenhouse generate? How many families can it feed? Can it supply the basics?
- 5.d.13** - Start small, build from there (small is beautiful) as community support also increases

POLICY ISSUES

How can local food production be re-generated ? How can we create cultural hubs for local communities?

5.Pol.1 - Statistics on what is being grown at the community level are not yet known, and need to be gathered

5.Pol.2 - Need to give people opportunities to respond in a really positive way

5.Pol.3 - Look at examples like St. John, Clarendville and Corner Brook farmer's markets

5.Pol.4 - Farm Festivals, local seed events to promote local products and food production

5.Pol.5 - Community gardens are now allowed anywhere in St. John's

5.Pol.6 - Some basic changes are needed in local regulations and policy

5.Pol.7 - Funders don't know how to deal with non-profits, more with commercial client

5.Pol.8 - Go to where people already buy their food and include local grown food

5.Pol.9 - Contradictions in policies need to be questioned and resolved

5.Pol.10 - All actors need to work all together

Parking Lot

5.Par.1 - Plantify in Marystown is good local example, and should be contacted for future involvement

5.Par.2 – For the 90 community gardens in our province, look at Food First report, online at healthyeatingnl.ca

5.Par.3 - Building codes (sanitary sewer was required for the Autism Centre greenhouse even though it has no bathroom)

5.Par.4 – May be limitations on lights at nights based on local regulations

Appendix B. List of topics for future meetings

- 1.b.1 - **Heat retention versus venting** – how to achieve the balance between these?
- 1.b.3 - **HOBO** heating systems (control of moisture, humidity, air temperature) (DAVID)
- 1.b.7 - **Earth-tube system** to be explored as a low energy input heating option
- 1.b.8 - What are **unanswered research questions** we want to use the greenhouse to answer?
- D. How can we maximize efficiency of **thermal mass storage** of sunlight and control of light?
 - * Have a separate session on **heat energy storage** (need case studies for design options)
 - * Where and how are new **food production sites** being created? Can we map these?
- 1.Par.3 - **Data on heat storage/tables** “Greenhouses for homeowners + gardeners” available online from government: documents to check are NRAES-137, NRAES-33, NRAES- 3
- 1.Par.6 **Public transportation** along Mt Scio Road is an important issue for our site.
- 1.Par.8 Develop a **community assessment** template for each site (see 5.b.4)
- 2.c.6 - **Minimum team to facilitate construction, internal or external**
- 2.c.7 - **Logistics** of transporting & assembling material
 - * **Organizational form/decision making** (2.d.1 to 2.d.7 gave us a complete answer to how to set up the team:)
 - 2.d.1 - Board of directors needed or not?
 - 2.d.2 - Make decisions consensually or top down?
 - 2.d.3 - Committed people, community oriented, without any private agenda
 - 2.d.4 - Social enterprise model
 - 2.d.5 - Greenhouse on public or private land?
 - 2.d.6 - Legal status to apply for grants, building permits, municipal support
 - 2.d.7 - Revenue model - Student employment, food production, bedding plants, seasonal activities, reviving lost skills, heritage renewal
 - * What specific **changes in local and provincial regulations** are needed to facilitate greenhouse projects in NL?
- 2.Par.1 - **Social media** as a primary communication motor
- 3.c.1/8 - Need to research **water requirements** related to growing particular crops
 - * Obtain a copy of book The Postage Stamp Garden - Double digging, organic enrichment
- 4.d.8 - We need a **hub for information and collaboration** in growing and gardening
 - * We need a meeting on **food storage, distribution and access**
 - * We need a session on **matching scale, size of production to local market.**
- 5.a.18 – To develop better technology transfer, create a good example, demonstrate effectiveness
- 5.b.4 – Develop an **evaluation tool to assess community resources, resistance, volunteers**
- 5.d.12 - **How much food can a greenhouse generate?** How many families can it feed? Can it supply the basics?
- 5.Pol.1 - **Numbers** on what’s being grown at the **community level** are not known
- 5.Pol.3 - **Look at examples of local distribution** - SJFM, Clarendville Market, Corner Brook
- 5.Par.1 – **Plantify** in Marystown a good example, case study
- 5.Par.2 - **Food First** has an online map of 90 NL community gardens: healthyeatingnl.ca