UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Building Capacity in UBC Campus Community Gardens

Bao Xian (Amy) Zeng, Emily Peer-Groves, Janela Sanqui, Liwen (Linda) Ling

University of British Columbia

LFS 450

Themes: Food, Biodiversity, Community

April 9, 2019

Building Capacity in UBC Campus Community Gardens

SEEDS Sustainability Program
UBC Botanical Garden

Report by
Amy Zeng,
Emily Peer-Groves,
Janela Sanqui,
and Linda Ling

Table of Contents

Executive Summary

Although interest and involvement in current UBC campus garden initiatives is growing, communication between these groups is fragmented. As a result, turnover in volunteers is high, and there exist gaps in information and equipment sharing between gardens, and overall student and faculty awareness is stifled.

This report provides an analysis and evaluation of the current and prospective scope of collaboration between UBC campus community gardens to identify opportunities for future engagement of and support from the UBC Botanical Garden. Our project aims to promote and enhance sustainable campus food production, social and educational connections between growers, and biodiversity conservation.

Our Main Project Objectives were to (1) build connections between the gardeners in and around the UBC campus community, (2) facilitate knowledge sharing and establish a network of information where gardeners can share their experiences with other gardeners, and (3) enhance environmental, social and economic sustainability of currently established community gardens.

Specifically, over the course of this semester we (1) hosted a workshop for the gardners informing them on how to increase the biodiversity in the community gardens so that biological integrity in and around the community gardens can be maintained; (2) designed a data collection tool and created a database to record produce yield from each garden for future management plan.

Through employing a Community-Based Action Research (CBAR) methodology, we delivered two surveys and one semi-structured interview before, during and after the workshop. Through the pre-workshop survey we found participants' interest in increasing food plant productivity, pollinator plants and soil health. From the interview results, we understand the gardens' perceptions to their gardens' strength, weakness, opportunities and threats in the perspectives of plant, people and place.We analyzed the responses obtained from the post-workshop survey and found that the harvest tool was poorly received and required further revisions to improve its accessibility to different users. The gardeners appreciated the opportunity to communicate and collaborate with other community members.

Our Recommendations are divided into a three-tiered action plan. Immediate action includes revising the 'Harvest Diary Tool' and create a sample garden governance template. Intermediate action includes facilitating educational workshops at different gardens on UBC campus and creating and distributing a community newsletter. Lastly, long-term action items involve hosting regular garden celebrations to showcase and launching a volunteer platform for individuals to sign up and help garden where it's needed most.

1. Introduction

1.1 Research Topic

The main goal of this research is to bring together representatives from community gardens in the UBC campus to a workshop and networking event led by students in the Faculty of Land and Food Systems and in collaboration with the UBC Botanical Garden. In this event, gardeners are able to share their knowledge about the food plants they grow in their community gardens and home gardens in order to build connection around the community and to establish a network of information where new knowledge is obtained. The participants of this event gained new ways to plan their gardens, learn interesting information about their crops, how to save money and maximize yield at the same time; and more importantly, to socialize during this event. In addition, this research project aimed to increase the environmental knowledge of the gardeners so they can have a more productive and sustainable garden that will boost the biodiversity in community gardens in UBC. Throughout this event, people will get to know other gardeners from UBC and nearby communities. This will contribute to establishment of positive relationships between the gardeners, breaking down communication and geographical barriers. Also, participants will be more knowledgeable about biodiversity in community gardens and accessible resources related to gardening.

1.1.2. Significance of Agrobiodiversity and Community Wellbeing

Humans rely on just 82 crop species to provide 90% of the energy we consume even though there are 12,650 edible plant species in existence, including 7,000 of which were utilized extensively by our species at some point in history (Kunkel, 1984). Cultivating greater diversity within our agricultural systems is increasingly recognized as a key proponent of

sustainable development; however, realizing this goal may prove increasingly difficult to achieve (FAO, 2018) (FAO, IFAD, UNICEF, WFP and WHO, 2018).

In spite of recurring warnings concerning the rapid loss of biodiversity (e.g. Cardinale *et al.* 2012; FAO, 2014) and the growing evidence of its critical role in in food security and nutrition, production systems around the world are becoming increasingly less diverse in terms of the ecosystems, species and within-species genetic resources that they contain. (FAO, 2019). Crop diversification and increased on-farm biodiversity can improve resilience through suppression of pest and disease outbreaks, buffering crops from extreme weather events and increasing climate variability. Despite the understood value of crop diversification, adoption has been slow.

Agrobiodiversity, or agricultural biodiversity, is a subsection of biodiversity that encompasses microorganisms, plants, and animals from the genetic to ecosystem level. These organisms maintain the structures, functions and processes in and around a farm system and provide food and non-food products (FAO, 2019). Crop biodiversity, an element of agricultural biodiversity, is the cultivation of a variety of crops at farm level and creates differentiations in soil fauna, insect pests, weeds and predators at farm level. An increase in on-farm species richness and a diversity of overlapping groups of species enhances the level of agricultural biodiversity, thus increasing ecological stability and crop resilience (Nastis, Michailidis and Mattas, 2012).

A study conducted in Los Angeles County, CA from 2010 to 2012 that investigated the factors that regulate community garden plant biodiversity found that gardeners preferentially plant species progressively less connected to human need, ornamental plant increases in high-income regions, and cultural and provisioning ES are important for immigrant populations, resulting in ethnically distinct crop assemblages (Clarke & Jennette, 2015). Understanding the potential of increasing diversity within farm systems is essential to

helping farmers adapt to greater climate variability of the future. By adopting farm systems that promote ecosystem services for pest and disease control and resilience to climate change variability, farmers are less at risk to production loss and are more generally resilient to environmental change (Lin, 2011).

1.2 Relevance to Sustainability on Campus

In 2014, UBC developed a 20-Year Sustainability Strategy Report in consultation with students, faculty, staff, the Musqueam First Nations, the University Neighbourhood Association, and other community partners to guide all future development of the university. The strategy outlined an intention to advance its guiding principles, "partnerships, integration, campus as a living lab, university as an agent of change off-campus, and promote human and environmental wellbeing (University of British Columbia Sustainability, 2014). Community gardens on campus not only provide hands-on opportunities for students, staff, faculty and residents to learn about sustainable food systems, they also fulfil many other roles, including the reclamation of public space, community building, and the facilitation of social and cultural expression (Corkery, 2004). A number of other UBC initiatives have visions that overlap with our projects goals, namely the Campus Biodiversity Initiative: Research and Demonstration (CBIRD) supporting a positive and nurturing relationship between the natural and built environment and the UBC Wellbeing Strategy that aims to overcome stress and anxiety, unhealthy food intake, and barriers to inclusion that affect academic performance (CBIRD, 2017) (University of British Columbia Sustainability, 2018). From creating interdisciplinary learning opportunities to fostering community space, and providing practical experiential education, UBC's numerous gardens turn aspiration for sustainability into actionable goals.

1.3 Project Context

The Regional Food System Strategy (RFSS) was adopted by Metro Vancouver in 2011, and its purpose is to create a sustainable food system to support the well-being of all residents and economic development without compromising the environment (Metro Vancouver, 2016). According to the RFSS, the design and establishment of community gardens and urban farms are identified as one of the solutions to reduce food miles and improve close-to-home food security, as well as promote healthy lifestyle and increase urban space greenness and usability. The RFSAP calls for the incorporation of gardening and growing space into the parks, recreational area and other existing public space. This aim can be partially fulfilled by our group project that sharing of knowledge and benefits of establishing and managing a productivity community garden will encourage more interested community members to join the party and contribute to improve both food literacy and food security.

Our project aims to fulfil the following SDGs:

Goal 3: Good Health and Wellbeing

Goal 4: Ensure inclusive and quality education for all; promote lifelong learning

Goal 11: Sustainable Cities and Communities

Goal 13: Responsible Consumption and Production

Disconnected garden projects is a problem other universities, communities and cities share. Our findings and workshop template could serve as a resource for other groups and improve scalability of community gardens and campus grown food initiatives (Luetz & Beaumont, 2019).

1.4 Project Goals and Objectives

1. To raise awareness about biodiversity amongst campus community gardeners by discussing the importance of biodiversity in a community garden and how biodiversity contributes to environmental sustainability.
2. Facilitate knowledge exchange and flow of information between gardeners by hosting a discussion period in the framework of a “World Cafe”.
    a. Introduce different type of resources to gardeners where they can post questions about their topics of interest and receive professional response from other fellow gardeners.
    b. Introduce a data collection tool that records total yield of different variety of crops they grow in the garden.
3. Enhance environmental, social, and economic sustainability in the community gardens.

2. Methodology and Methods

2.1. Research Methodology

In this study we employed a Community-Based Action Research (CBAR) methodology, a consensual approach to research that is based on the assumption that cooperation and positive working relationships should be the main focus of an inquiry so all parties may benefit (Juergensmeyer, 2011). In accordance with the Behavioural Research Ethics Board (BREB) policies, we secured informed consent before engaging with our participants.

2.2. Research Methods

2.2.1. Literature review

Literature was collected in two ways: first from searches using the University of British Columbia Library search function and second from cross-references from articles. The first search using the library resource was for "sustainable agriculture AND community gardens" and filtered by peer-review articles only. The second search was for "community garden biodiversity" and not filtered. Literature was chosen because it was cross-referenced and because of the frequency with which it appeared as a reference in other papers.

2.3 Primary Data Collection Research Methods

2.3.1 Primary data

Workshop Design

During the first part of the workshop event, our group introduced ourselves, the SEEDS programs and initiatives, and the UBC Botanical Garden programs. We also shared resources and information about other useful organizations or groups that the community gardeners can reach out to when they need help, whether a seed source, tools or equipment needs. The highlight of the presentation was the launching of "My Harvest Diary" tool, a software powered by Qualtrics, for recording harvest yield data. Then, group discussions were initiated. Subsequently, a 20-minute food garden tour led by Dr. Tara Moreau followed the activity. Lastly, the participants were encouraged to answer a post-workshop survey printed on paper or via online.

Workshop Data Analysis

The discussion was arranged in a "World Café" setting, in which the participants were divided into 6 groups. Each group was assigned with themes: people, plants or place. Then, we introduced the Strength, Weaknesses, Opportunities and Threats (S.W.O.T.) Analysis to the group, and asked the following set of questions:

- *What are the S.W.O.T. of the **people** involved in your garden*?
- *What are the S.W.O.T. of the **plants** growing in your garden*?
- *What are the S.W.O.T. of the **place** / location of your garden*?

The participants were given 5 minutes per question to write down and discuss their responses with their group. After each question, a bigger discussion was conducted, allowing participants from all other groups to share their answers. The participants' responses were transcribed and used for qualitative data analysis.

Quantitative Data Analysis

Towards the end, attendees were encouraged to share their thoughts about the entire workshop through a post-workshop survey. Through this, we obtained our quantitative data. After 3 days, we decided to send out the link to the survey in order to gather more data from non-attendees. Through the Qualtrics software, we were able to analyze our quantitative data.

2.5 Methods of Administration

For two months (January 16th to March 6th), we arranged to meet with our client every two weeks. During these meetings, we revisited last year's project, discussed ideas and planned the execution of the workshop event. Three weeks prior the workshop event (March 7, 2019), the Eventbrite invitation page was published and opened for everyone to sign up. In addition, Dr. Tara Moreau, Associate Director for Sustainability and Community Programs of UBC Botanical Garden, sent a formal online invitation along with the website link to the Eventbrite page to all

campus community garden managers through email. In addition, a Facebook event page was created to attract more attendees. Meanwhile, our group deliberated and planned on the presentation and activities for the participants. The two-hour event was proposed to happen at the UBC Botanical Garden Reception Centre. With the funding we received from SEEDS, refreshments and food were ordered a week before the event.

We chose the method of online surveys over face to face interviews because the participants may not have time available after the event to answer the sets of questions we have provided on the survey. We made a survey that is available on paper as well as online so they can be easily accessible by the participants to fill out at their own time. That way, it allows for more time for the participants to formulate their feedback about the event and to record it down on the survey.

3. Results

3.1. Pre-workshop survey results (n=35)

We received 35 complete responses to this pre-workshop survey. Participants for the workshop were asked to fill in the survey when they registered for the event through eventbrite. The participants came from 14 different community gardens on and around the UBC campus. There were some of the participant not yet have their own gardens and were looking forwards to start a new one in the near future, and there were other of them are home gardeners. Most survey participants responded to know the information about the workshop from community garden newsletter or emails and small portion of them got the information from social media (e.g. Facebook) and eventbrite website. According to the participants' responses, the top three

interested topic for the community gardeners are: pollinator plants, increase food plant yields and soil health.

3.2. World Cafe discussion (S.W.O.T.) results (semi-structured interview during workshop) (n=25)

During the world Cafe section of the workshop, participants reflected on their own gardens for their strength, weakness, opportunities and threat in the perspectives of the plant, people and place. Participants identifies the key strength of their gardens to be the very accessible location, high variety of food plants and some of them had well-structured governance for management and decision making. However, most of the participants voiced the lack of governance structure to be one of the major weakness of their garden, along with the demand for more space and funds. Some participants also had difficulties to increase their biodiversity or food productivity. When talked about opportunities, participants hoped to held more garden parties, to have more professional seminars and to establish crop rotation plan to promote pollinator. Participants identified the threats to be the high turnover rate of volunteers and administrators from semester to semester, the missing of comprehensive weeds and pests management, and the lack of connectivity between different gardens.

3.3. Post-workshop survey results (n=23)

We received 23 complete responses to the post-workshop survey, with the exception of some questions being missed out. The majority of the participants were UBC students and neighboring community members from the age range of 18 to 44 (Table 1.). According to the survey responses, the participants hoped the future workshops to happen every once a month (57.89%) or once every two month (31.58%) particularly around the topic of growing fungi, overwintering crops and seed harvesting (Figure 1.) (Table 2.)

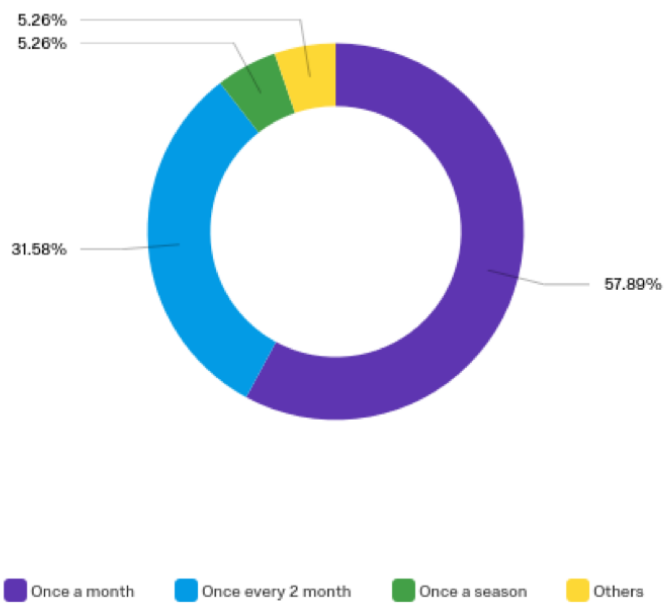

Figure 1. Preferred frequency for future workshop

Table 1 Self-identified identity distribution for survey participants

Identity	%
Student (Pre-university)	5.26%
University student	36.84%
UBC faculty member	0.00%
Community member	26.32%
Others	31.58%
Total	100%

Table 2: Participants' interested topics for future workshops

Interested topics	Percentage
Integrated Pest Management	14.06%
Seed Harvesting	17.19%
Expert Seminar	15.63%
Growing Fungi	18.75%
Weed Identification	15.63%
Overwintering crops	18.75%

3.4. Volunteer Recruitment

Regarding volunteers, 47% of the survey participants responded that they do not need volunteers at their gardens while the remain 53% have or hope to have volunteers in their gardens. The high responses for no need of volunteers are related to the fact that many of the participants are students or volunteers themselves which makes them a weak representative to talk about the human resource status of the garden, and also some of the participants are home gardeners or not yet have a garden which make this question less applicable to them. Among those who want to have volunteers in their gardens, 23% of them hope to have some volunteers every week, 30% of them hope to have some volunteers a few days a month and rest of them hope to have volunteers during summer or when events happen.

3.5. UBC Campus Garden Network

Participants provided positive feedback on the effectiveness of the workshop that 68% of them responded that they learned how to improve the agro-biodiversity of their gardens. More than 50% of the participants responded that the workshop help them to identify various resource they can utilize to improve their gardens, including UBC Botanical forum,garden shop, SEEDS projects library and other existing resource, equipment sharing platforms. Most of the participants had no difficulty to find heritage seeds or planting equipments. 63% of the participants responded that they believe their garden would benefit from being in a UBC community garden network and they hoped to learn more gardening skills and knowledge (e.g. seed saving, pest and weed management), communicate and collaborate with other gardens through social events, as well as to share resource and information about tools, equipment and plant materials.

3.6. Harvest tool

The intention of the "My Harvest Diary" is to thoroughly recognize and evaluate the current agrobiodiversity at each garden, most of the workshop attendees were not interested in the idea of weighing and recording their crop yield. More than 50% of the participants responded that they are not recording their harvest yield currently and did not see the necessity of doing so in the future. There is lack of motivation to record the harvest and the accessibility of the tool is not satisfactory.

4. Discussion

4.1 Discussion of Findings

4.1.1. Strategies to Increase Workshop Attendance

Based on the pre-workshop survey and workshop attendance, a better strategy is needed in order to acquire more participants during the event, because it was lower than the anticipated participants. We wanted to collect more valuable feedback, as well as to meet and hear from

all campus community gardeners, however, only a few of them went and represented their gardens. We sent out a follow-up email along with the link to the post-workshop survey to the community gardeners who were not able to attend, but it did not bring a significant difference when we were analyzing the quantitative data.

Despite this, we found during the workshop activity that there were a lot of interested and individual gardeners from nearby residential areas, particularly on topics about improving their knowledge and skills in gardening!

4.1.2. Adjustments to 'My Harvest Diary' are Necessary

We realize the harvest tool was poorly received due to the language and technology barrier, and the lack of motivation to recording yields. The current layout of the harvest tool is hard to navigate through and require adjustment to improve its accessibility. The harvesting tool needs to be more inclusive in terms of language, as many of the participants are not fluent in English yet still is enthusiastic in gardening and acquiring new knowledge. To do so, we can integrate definition of difficult words in their native language to improve their English vocabulary so to speed up the learning process. In addition to improving the learning process, we can also stimulate interaction between the gardeners by hosting social events much similar to the one we hosted on March 7 (Kim, 2011). As people get to know each other, the atmosphere will be more relaxing and people will feel comfortable. Incentives to use the Harvest Diary could be worked into future events. For example, certificates or small prizes could be awarded to gardens who use the tool at a campus wide event.

4.1.3. Duality of Volunteer Supply and Demand

We recognize the strong desire for more social connection among gardeners. They hope to learn more about decision making strategies and gain more knowledge regards biodiversity

and sustainability

We identified a gap within volunteer schedule and distribution over the semesters and during summers. Many participants pointed out that a clearer and inclusive volunteer schedule will help them to better allocate the human resource during summer seasons and when events happen. Currently, the problem hinders the efficiency of resource distribution for both ends. People who have the willingness to volunteer do not have a place to look for information and sign-up. They need to visit multiple websites to sign up for individual events and have a hard time to match the event's timetables with their own schedule. On the gardener's end, some managers have difficulty to distribute the excessive amount of volunteer they received during working semesters while other of them have a hard time to find enough volunteers during summer season when most of the volunteers leave the campus. We think a comprehensive sharing schedule and sign-up sheet should be created, where all gardeners can post their demand for volunteers and all people who want to volunteer can view the garden's schedule and sign-up as they seem fit.

4.2. Limitations

After collecting feedback from the gardeners from our post-workshop survey, we discover with two barriers and one huge potential for our project. The first and the most important one was the harvest recording tool we designed for our community partner as well as the gardeners was not well perceived. Another barrier we discovered was the inconsistency in the volunteers available for gardening each season for each garden as well as the lack of a proper platform for them to signup and for the gardens' administrators to keep track.

Many of the gardeners mentioned that there is an inconsistency of volunteers in their gardens. We narrowed the feedback down to two major causes: 1) the lack of presence of a platform where volunteers can signup to be distributed to the garden or their choice; and 2) there

is a lack of volunteers during the “heavy” harvesting--summer. Furthermore, many gardeners informed us that there are people who are interested in volunteering in their gardens but just don’t know where to sign-up. To resolve this issue, we need to create an online platform where not only UBC students, but also people who live near UBC campus that are interested in helping out in a garden to sign-up throughout the year. When we create such an online platform, efficiency will be improved and the gap of volunteers will be closed (Boles, 2013).

5. Conclusion

At the end of the project, we have completed three main objectives. We have created an event that allows gardeners in the UBC campus to gather and socialize. This event and upcoming future events will be the platform where gardeners can exchange personal information, knowledge about gardening as well as just socialize under a relaxing atmosphere. The event was a success, despite a few moments of awkwardness in the very beginning due to meeting new people and being invited to a student-host event; the participants were able to adjust to the new environment quickly and proceeded to socializing with each other. The second research objective we completed was the success in bringing the participants’ attention to the importance of agro-biodiversity in a garden and have raise their awareness about the topic. We did this through a series of slides integrated in a PowerPoint presentation during the event held in the UBC Botanical Gardens. Taken into consideration that the gardeners have different understanding to the word “agro-biodiversity” we decided to make a short introduction about the definition of agro-biodiversity and then start going deeper and deeper into the application of the word. Lastly, we have facilitated discussion in a very organized format using the “World Cafe” design about sustainable gardening practices and gathered information from the gardeners about their understanding of sustainable practices. In essence, the event allowed the connection between community gardens around the UBC campus to be strengthened because communication between the garden was enhanced. If the events were to continue, connection between the gardeners can be greatly improved as well as the flow of information and the exchange of

resources. By organizing monthly social events, the bond between the gardeners will be fortified and the network will be expanded, resulting in an everlasting relationship between the gardens.

6. Recommendations

6.1 Action and Implementation:

Upon analyzing the responses from the post-workshop survey, we came up with three levels of recommended action: immediate, intermediate, and long-term recommendation. We devised 3 immediate actions that are to be implemented in the near future for the UBC Botanical Gardens.

6.1.1. Immediate Action Plan

(1) **Revise the Harvest Diary** to make it more accessible to those who are not "tech-savvy", allowing it to be available on paper and to make a PDF version of it so the gardeners can select which varieties of crops they harvested instead of printing the entire diary. If we can achieve this goal, we can increase the accessibility of the harvest diary.

(2) **Create a sample garden governance template** for the gardeners to access and perhaps adapt to in the garden so that decision making process is simplified and clear. Our third immediate action is to have the UBC Botanical Gardens to collaborate with the Cultivating Learning Network to facilitate collaborative learning with the gardeners as well as creating opportunities for the gardeners, students, faculty members to establish a long-term partnership in the campus. In order to make our project have a long lasting effect, these three actions need to be implemented as soon as possible in the near future.

6.1.2. Intermediate Action Plan

(1) **Hold educational events in the gardens of UBC campus.** Examples of educational events include: introduction to integrated pest management, weed identification, seed saving as well as crop specific pest management. These topics would be introduced by a guest lecturer who is profession from the field in question or be introduced by students who are working on this project next year as an integrated presentation which contain information from research articles to help the gardeners build a strong foundation. After these educational events the gardeners will be equipped with knowledge about how to create a better more biodiverse garden so the crop they plant will thrive under the conditions they created.

(2) **Create and distribute a newsletter** to the gardeners in the UBC campus and anyone who is interested in gardening (ie. students) to keep them updated. The content that will be included in the newsletter are: monthly event schedules, fun facts about gardening, harvesting time of certain crops and volunteering information that allow the people to be informed and kept within the "circle" of communication. These two intermediate actions were decided by our group based on the feedback from the event hosted by our group and the UBC Botanical Gardens. The participants were fond of these types of social and informational gathering and they suggested that once a month event is the best to keep everyone informed and to better connect with each other.

6.1.3. Long-term Action Plan

(1) **Host regular garden celebrations at different gardens in UBC campus** on a monthly basis during Winter and Spring terms, and to host bi-weekly garden celebrations during the summer season as harvests tend to be heavy during the summer since it is the best season to have a garden. As urban agriculture is becoming common in cities around the world, many community gardens are beginning to appear in urbanized areas. These types of gardens not only serve as a

place to grow food, but also a place where people gather; gardeners and non-gardeners alike. By hosting social events in these community gardens, we can stimulate interaction between the people as well as strengthen community bonds (Hou, 2017).

(2) **Create a volunteer platform** where not only UBC students but also the general public who are interested in helping out in the gardens during different seasons so they can sign up and be distributed to the garden they preferred to volunteer in. By doing so, we will be making this more inclusive to the public so we are not excluding anyone who is interested in helping out in gardens who have a curious mind about learning new skills for gardening. An online platform is what this recommendation aims to create, as such can improve effectiveness of the volunteer sign-up and distribution process and to also boost efficiency (Boles, 2013)

Due to the complexity involved in these two objectives, time is the key component to achieving success in these two goals.

6.2 Future Research

We have identified three main research proposals. Firstly, determining exactly what goals the gardeners have regarding the purpose of their gardens needs to be documented before successful and highly adoptable tools can be designed for their benefit. An analysis of the values individual farmers place on the landscape is important in understanding agricultural development and related landscape changes (Busck, 2002). As a result of a smaller workshop turnout, our group may not have gained clear and representative feedback of all community gardeners at the UBC campus. For the project next year, an one-on-one interview with the gardener would be much preferred. Upon gathering the information from the gardeners, the students next term can then formulate suggestions to meet the needs of the gardeners.

The next potential research proposal for the future would be the development of multilingual version of the resources so that people who are new to Canada and is of a different ethnic background can

access the information as well. By doing so, we will be creating an environment that is inclusive instead of exclusive to those who are proficient in English. The creation of a multilingual resource platform will not only make this an inclusive event, but also creates the representation of how diverse this community is. Our last long-term goal is to put an emphasis as well as to create an emphasis on the need to have a harvest diary. During the event, many participant were uninterested in the need to keep track or their yield and deemed the recording of such information is unnecessary because that is not what they used to be doing. By putting an emphasis on the benefits of keeping a harvest diary to them as well as providing a small incentive in filling out the diary, participation can be boosted and they will show willingness in tracking their yield. If these three tasks can be achieved in the future, it will have an immense impact on our foundation and can greatly benefit the community as well as the UBC Botanical Gardens.

7. References

Andersson, E. (2015). Turning waste into value: using human urine to enrich soils for sustainable food production in Uganda. *Journal of Cleaner Production*, *96*, 290-298.

Bakker, K. and Ritts, M. (2018). Smart Earth: A meta-review and implications for environmental governance. *Global Environmental Change*, [online] 52, pp.201-211. Available at: https://www.sciencedirect.com/science/article/pii/S0959378017313730.

Boles, B. (2013). Technology's role in the nonprofit sector: increasing organizational effectiveness and efficiency through technology innovations.

Byerlee, D., de Janvry, A. and Sadoulet, E. (2009). Agriculture for Development: Toward a New Paradigm. *Annual Review of Resource Economics*, 1(1), pp.15-31.

Cardinale, B.J. et al. (2012). Biodiversity loss and its impact on humanity. *Nature* 486: 59-67.

City of Vancouver. (2016). *Regional Food System Action Plan*. Vancouver. Retrieved from http://www.metrovancouver.org/services/regional-planning/PlanningPublications/RegionalFoodSystemActionPlan.pdf

Clarke, L., & Jenerette, G. (2015). Biodiversity and direct ecosystem service regulation in the community gardens of Los Angeles, CA. *Landscape Ecology*, *30*(4), 637-653. doi: 10.1007/s10980-014-0143-7

Hou, J. (2017). Urban community gardens as multimodal social spaces. In Greening Cities (pp. 113-130). Springer, Singapore.

Food and Agriculture Organization. (2014). *Building a Common Vision for Sustainable Food and Agriculture – Principles and Approaches*. [online] Rome: Food and Agriculture Organization of the United Nations, pp.4-12. Available at: http://www.fao.org/3/a-i3940e.pdf

Food and Agriculture Organization. (2019). *The State of the World's Biodiversity for Food and Agriculture,* J. Bélanger & D. Pilling (eds.). FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome. 572 pp. (http://www.fao.org/3/CA3129EN/CA3129EN.pdf)

FAO, IFAD, UNICEF, WFP and WHO. (2018). *The State of Food Security and Nutrition in the World 2018. Building climate resilience for food security and nutrition*. Rome, FAO. Licence: CC BY-NC-SA 3.0 IGO. http://www.fao.org/3/I9553EN/i9553en.pdf

Johnson, P., Keesing, F., & Ostfeld, R. (2015). Frontiers in research on biodiversity and disease. *Ecology Letter*, *18*(10), 1119-1133. doi: 10.1111/ele.12479

Kunkel, G. (1984). *Plants for human consumption : an annotated checklist of the edible phanerogams and ferns* (pp. 11-14). Koenigstein: Koeltz Scientific Books.

Lin, B. (2011). Resilience in Agriculture through Crop Diversification: Adaptive Management for Environmental Change. *Bioscience*, *61*(3), 183-193. doi: 10.1525/bio.2011.61.3.4

Nastis, S., Michailidis, A., & Chatzitheodoridis, F. (2012). Climate change and agricultural productivity. *AFRICAN JOURNAL OF AGRICULTURAL RESEARCH*, *7*(35). doi: 10.5897/ajar11.2395

Ng, P., Pinnell, L., Yan, N. and Yaoutsis, A. (2018). Diversity of food plants in UBC's Community Gardens. Retrieved from the UBC Social Ecological Economic Development Studies (SEEDS) website: https://sustain.ubc.ca/sites/sustain.ubc.ca/files/seedslibrary/LFS450_FoodPlantDiversity_FinalReport.pdf

United Nations. (2016). *Paris Agreement* (pp. 1-27). Paris: United Nations. https://sustainabledevelopment.un.org/frameworks/parisagreement.

8. Appendix

Appendix II. Post-Workshop Survey Questions

Post-workshop survey question
Q1 Tell us a little about yourself.

- o Student (Pre-university) (1)
- o A hardworking university student (2)
- o A dedicated UBC faculty member (3)
- o A passionate community member (5)
- o Others (4) _____

Q2 How young are you?

- o under 18 (1)
- o 18 - 24 (2)
- o 25 - 34 (3)
- o 35 - 44 (4)
- o 45 - 54 (5)
- o 55 or older (6)

Q3 Which community garden do you belong to?

_____

Q5 What crop are you most excited to grow this spring? Why?

_____

Q8 What crop do you find the most difficult to grow? Why?

_____

Q30 How much do you agree with each of the following statements?

	Strongly Agree (1)	Somewhat Agree (2)	Neither Agree nor Disagree (3)	Somewhat Disagree (5)	Strongly Disagree (6)
"After today's workshop, I learned how to improves the agro-biodiversit of my garden." (1)	o	o	o	o	o
"I see myself using resources provided by UBC Botanical Garden." (e.g. their garden forum, their garden centre shop) (3)	o	o	o	o	o
"I would like to learn more abou SEEDS projects and opportunities." (4)	o	o	o	o	o
"I have all the equipment I nee to manage my garden." (6)	o	o	o	o	o
"I have difficult acquiring seeds for my garden." (7)	o	o	o	o	o
"I have difficult acquiring heritage seeds for my garden." (8)	o	o	o	o	o

"My garden would benefit from being in a UBC communit garden network " (5)	o	o	o	o	o
"I record my harvest yield." (9)	o	o	o	o	o
"I am willing to share my recorded yields with the UBC Garden Network." (10)	o	o	o	o	o

Q14 Do you have volunteers at your garden?

o Yes, there are volunteers that work in my garden. (1)

o No, I do not need any volunteers. (2)

o March already?! Planting season is coming - I need all the help I can get. (3)

Q15 If you have or want to have volunteers, how often will you need them?

o Some volunteers each day (1)

o Some volunteers every week (2)

o Some volunteers a few days a month (3)

o Others (4) _____

Q32 Where do you go to learn about gardening skills?

o A friend (1)

o My ancestors (3)

o I wing it (4)

o Online (e.g. Youtube or UBC Botanical Garden Forum) Please specify. (5)

_____

Q23 What are you most interested in gaining from a UBC campus garden network?

- ☐ Tools and equipment (eg. wheelbarrow, shovel, secateurs) (1)
- ☐ Training sessions (e.g. seed saving tutorial, crop specific pest and weed management) (3)
- ☐ Social events (e.g. campus wide garden party) (6)
- ☐ Other (7) _____

Q6 What topics are you most interested in learning about in a future workshop or event? Select as many options as you like.

- ☐ Integrated Pest Management (8)
- ☐ Seed Harvesting (9)
- ☐ Expert Seminar (10)
- ☐ Growing Fungi (11)
- ☐ Weed Identification (12)
- ☐ Overwintering crops (14)

Q21
Let's turnip the beet! If you're interested in future campus community garden events, where would you like to meet?

- o Social media (i.e. Facebook) (1)
- o UBC Botanical Garden (2)
- o Another UBC community garden (3)
- o Other (5) _____

Q10 How often would you like to see an event/workshop happen?

- o Biweekly (1)
- o Once a month (2)
- o Once every 2 month (3)
- o Once a season (4)
- o Others (5) _____

Q24 Do you have any suggestions you would like to provide to help us improve the "My harvest diary" for the benefit of future campus gardeners? (This includes the structure, the content, the layout, etc.)

_____
_____
_____
_____
_____

Q7 What are your preferred tools for communication about future events?

- ☐ Social media (e.g.Facebook) (1)

_____

- ☐ UBC Botanical Forum (2)
- ☐ Newsletter or e-publication (5)
- ☐ Email (6)
- ☐ Other (7) _____

Appendix III. S.W.O.T. Discussion Responses

Code Lists:

S = STRENGTH **O = OPPORTUNITIES**

W = WEAKNESSES **T = THREATS**

1. "Weakness: lack of enforcement"
a. PLACE - WEAKNESS - lack of enforcement against theft
2. "Strengths: foot traffic, sun, Macmillan (LFS students). Weakness: very exposed, end of campus."
a. PLACE - S - high foot traffic, lots of sun, near Macmillan.
b. PLACE - W - very exposed, no wind break, not centrally located.
3. "Plants : lack of variety in plants, seasonal crops, easy root veg. (beds)"
a. PLANTS - WEAKNESS - lack of variety in plants, only grow easy root vegetables.
4. "Opportunities: orchard garden workshops, seed library, crop swap."
a. PLANTS - O - orchard garden workshops, seed library, crop swap > tools
5. "Weaknesses: space, lack of soil, can't grow enough for food production"
a. PLACE - T - space being taken away from garden, yields are low, lack of soil / materials for food growth
6. "Weaknesses: power usage for lighting indoor food growth"
a. PLACE - W - power usage for lighting indoor food growth (seasonal challenges)
7. "Plants: Strength: easily managed, mobile, governance."

a. PLANTS - S - easily to grow plants, mobile, governance
8. “Backyard Garden”
a. PLACE - O - encourage everyone to grow food at home too?
9. “Opportunities: Developing new gardens”
a. PLACE - O - developing new gardens
10. “PLACE: Strength: space”
11. “Threats: Theft.”
a. PLANTS - T - theft
12. “Strength: we have increased interest from people”
a. PEOPLE - S - lots of people wanting to volunteer
13. “Rhodo gardens - Weaknesses: need enough sunlight, shade, slugs, weeds”
a. PLACE - W - need enough sunlight, shade, slugs, weeds
14. “Plants - Strength: leafy vegetables grow better. Weakness: not enough sunlight, warm temperature, too ripe. “
a. PLANTS - S - leafy vegetables grow well
b. PLANTS - W - not enough sunlight, warm temperature, too ripe
15. “Opportunities - governance, usage of seed bank”
a. PEOPLE - O - governance, usage of seed bank
16. “Threats: homeless people, theft”
a. PLANTS - T - homeless , theft
17. “People: Weakness: theft of fruit and vegetables. Strengths: sharing vegetables.”
a. PEOPLE - W - theft of fruit and vegetables.
b. PEOPLE - S- Sharing vegetables
18. “Opportunities: shared tools b/w the gardens.”
19. “Plants - S:Freedom to grow whatever, W: Mostly root plants, O: next to grad garden which is diverse, finding seeds. T: no variety, management over the summer.”
20. “Plants - weaknesses - weeds”
21. “Nobel Garden. the place is good within our community, but need more volunteers”
22. “Place - S: centrally located, W: transient student population, O: community members to volunteer”
23. “Opportunities - student Wellbeing, cohesive signage, there’s always more space. The app needs to be in mult. Languages”
24. “Student residing for summer volunteers”
25. “place - garden is aging, fence, UBC infrastructure, very hard to be done”
26. “People - easy to maintain home garden”
27. “Place - S: traffic, room for development, good gathering space; W: irrigation, compost; O: close to first year residences, room for growth; T: no ongoing leadership
28. “Plants - S: some indigenous plants (lupin, strawberry), good winter crops; W: mostly vegetables, unknown soil quality; O: more pollinator plants. More fruit, more organized, more indigenous plants; T: lack of composting”
29. “ S: productive per capita, variety, winter crops W: no fruits; O: vines; T: most students are gone in the most productive season.”
30. “ Place - home gardening shade, rabbits”
31. “Water availability, turn off without notice, storage - no pace to put, communication with Administration team”
32. “Place - S: in a courtyard of geog, store gardening stuff; W: location is far; O: add more plots, next to grad garden; T:Lack of organization. People - S: managed by GSA exec. Team W: not many volunteers always different; O: lots of students and GSA members; T: Turnover of managers, summer management.”

33. " Monitoring compost station: confusing and lazy, language barrier. Place - shade, cedar, road construction."
34. "Theft - how to prevent not welcoming. Why not pumpkin. Signage"
35. "Post info around campus for year round residents to fill the gap in summer workers"
36. "To map out benefits drawbacks of growing each family of crops. Also seed saving and ordering them all together.
37. "Previous users planted seeds we don't know where in the rotation to start" (communication breakdown over time)
38. "Scale? -> the last thing
39. "Some old type for info record/ deliver. KNowing the history of the plot you are taking over. Tools- dont need much. People - who has the power, coordination due to the debt. Compost delivery. Sometimes there is trash in it. Plastic.
40. "Signage. Light issues. Instagram and facebook coverage. Fungus!"
41. Balcony Planters. Threats - Peeping toms, bicycle thieves, sugar ants. Thunderbird apartments"
42. "Peas carrots beets garlic onion tomato kale arugula lettuce tomatillos beans zucchini spinach cilantro parsley oregano chives basil sorrel swiss chard marigold"
43. "Strengths Plants - Arugula, bok choi, oregano, kale, beans, rosemary."
44. "People Strengths - sharing tools"
45. "Orchard garden threats: rats, rent, fungus, area"
46. Have a volunteer platform for students to sign up

Appendix IV. Event Timeline Plan

DATE OF EVENT Thursday, March 7 4:00pm - 6:00pm
CLIENT LFS 450 - SEEDS Sustainability Program
ATTENDEES UBC Community Gardeners
CONTACT N/A
EVENT STAFF Tara, Christina, LFS Students

BACKGROUND
LFS 450 SEEDS Sustainability networking workshop for Community Gardens of UBC Campus.

EVENT AGENDA:

12:00 - 2:00	*Save On food delivered to Campbell Building*	Christina to place in coolers in Reception Centre
3:00 - 3:45	*Set up Reception Centre*	LFS 450 Group / Tara / Christina

Thursday, March 7

3:45 - 4:00	Guests arrive - Registration / name tags - Refreshments	All
4:00 - 4:20pm	Networking and icebreaker ● Music in background ● Encourage guests to network ● Introductions - Tara invites group to circle up	Registration team: Christina and Linda Refreshments team: Amy and Janela Floaters: Emily and Linda
4:20 - 4:40	Welcome by student 'emcee': Shape of the event Housekeeping - washrooms and refreshments	Emily and Janela
	LFS Students presentation	All students
	Garden presentation	Tara
4:40 - 5:10	World Cafe - 7 min each table ● Emily to ring chime for table rotations	All
5:10 - 5:20	Prepare group for Garden tour	All
5:20 - 5:45	Tour of Food Garden	Tara
5:45 - 5:55	Post-event survey	Amy
5:55 - 6:00	Wrap up and thank you	Students

LOGISTICS

SETUP 40 chairs (8 each table)
5 round tables, 1 registration table, outreach table, a/v table
Tea set/glasses for punch/Coffee & Hot water urns

CATERER/FOOD Save On order to be delivered to Reception Centre between 12-2pm
Order # **2093585** including coffee and beverages

PHOTOGRAPHER Someone should take photos

ADDITIONAL SUPPLIES

- Name tags - name and favorite food to grow
- Pens/Markers
- Print registration
- World Cafe questions printed
- Whiteboard for workshop welcome
- Photo waiver at registration table
- Coffee/Hot water urns, glasses or tea cups, milk/cream/sugar, napkins

Appendix V. Event Internal Document

PRE-Event:

- Print the Eventbrite registration and workshop feedback forms
- Name tags, pens,
- World Cafe supplies organized
- Outreach table
- Food table setup

3:00-3:45 Room set up

3:45-4:00: Welcoming people. Registration and invite guests to make name tags. Sign in for the guests, settling down in the seats and refreshments being served.

4:00-4:20: Networking and icebreaker

- Everyone is welcome and start convo if see someone by themselves.
- Play music to create casual environment
- Icebreaker: introduction by gardeners, hosts - Tara to invite guests to circle

4:20-4:40 UBC Botanical Garden, SEEDS and the students from LFS 450.

- MC: Welcomes and goes over the shape of the event (Emily and Janela)

Housekeeping - bathrooms and food

Slides presentation by LFS students and garden hosts

- Slide about LFS students and the platforms (Names of speaker)
- 2 slides on SEEDS and the diversity of projects that they host (Name)
- 10 slides on the garden (Tara and Christina)
- Networking platform
- Forums
- Shop in the Garden

- 2-3 slides to introduce to the Harvest Data Tool
- Final slide - introduces the activity
  - Goal of the Activity - SWOT of the plants, people and places of community gardens at UBC
- Plants - What are the SWOT of growing plants at your garden? Or in your bed? (e.g. plant species, varieties, pests, local compost, etc)
- People- Whare the SWOT for managing people and volunteers at your garden? (e.g. group decision making, volunteer or collaborating with other gardens)
- Place - What are the SWOT of your location? (e.g. permit, shade, etc? (LFS students)
- 4:40-5:10: World Cafe activity and sharing of the outcomes at the last 5 minutes of what each table came up with for the topics they have been assigned. (Chime - 7 minutes for each table-Emily) 3 minutes for reporting back to the big group
  - Plants - What are the SWOT of growing plants at your garden? Or in your bed? (e.g. plant species, varieties, pests, local compost, etc)
  - People- Whare the SWOT for managing people and volunteers at your garden? (e.g. group decision making, volunteer or collaborating with other gardens)
  - Place - What are the SWOT of your location? (e.g. permit, shade, etc?
- 5:10-5:20: Clean up of the facility and guests being taken to the entrance of the Botanical garden to be prepared for a tour around the garden given by Tara.
- 5:25-5:40: Guided tour of food garden
- 5:40-5:55: Fill out post-event survey.
- 5:55-6:00: Wrap up lecture.

Set-up Team
Registration Team: Christina and student
Refreshments Team:
Student hosts: Emily and Janela
Timekeeper:
Gong ringer: Emily

Action item:
Garden
- connect with Eric about space and late lockup
- Day of: print registration and workshop feedback form
- Finalize slides into the google slide
- Food delivery--to reception center
- Whiteboard for workshop welcome

LFS team
- Slides (make a copy in folder)
- MC
- Food (finalized and ordered)
- Feedback
- Harvest tool checked prior to the event
- Send to Tara

World Cafe Forum Framework

Goal to design and deliver capacity-building workshop for members of UBC's community gardens.

- What are the needs of your community
  - Knowledge requirement
    - How you acquire this type of knowledge
  - Difficulties in running gardens during different seasons
    - Barriers in building social connection, enhancing biodiversity, and advancing food production-SWOT (the ultimate postcard for the world cafe: can have background on projector (maybe a platform or website where we can actually add onto that))
- Opportunities
  - Food production
  - Biodiversity
  - Social connection
  -
- Aside from financial support, what resources do you need to keep your garden going?
- How do you acquire these resources? What do you have to do to acquire them?
- In what ways do gardens rely on the support of others (non-members) for assistance (growing instructions, garden design insight, transportation, etc.)
- How important, if at all, are social connections to the success of the garden?
- What do you consider to be a successful season?
- What influences the crops you choose to grow?
- **include the survey questions: the 3-5 key questions we want the input

Community gardens' contact list from last year's project:

- Acadia Park Garden - acadiaparkgarden@gmail.com
- Agronomy Garden - agronomygarden@gmail.com
- ANSO Community Food Garden - soci.head@ubc.ca
- GeoGarden - info@ubcgsa.ca
- Hawthorn Community Garden - reception@myuna.ca
- Michael Smith Lab Garden - Email Guillaume at gdejean@msl.ubc.ca
- Nobel Park Community Garden - reception@myuna.ca
- Orchard Garden - theorchardgarden.info@gmail.com
- Rhododendron Community Garden - reception@myuna.ca
- Roots on the Roof - rootsontheroof@gmail.com
- UBC Farm

Budget:

$100 dollars

https://foodshare.net/program/communitygardens/

^ **Foodshare** good resource for "fluffy wording"