

University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

# Developing Strategies to Promote Diversity in Food Garden Production: Action for Nature in a Changing Climate

Prepared by: Franco Lopez Campomanes, Sahar Kazemeini, Anica Li, Joanna Pappo, Wei Yan Yeong

Prepared for: UBC Food Services

Course Code: LFS 450

University of British Columbia

Date: 26 April 2021

*Disclaimer: "UBC SEEDS Sustainability Program provides students with the opportunity to share the findings of their studies, as well as their opinions, conclusions and recommendations with the UBC community. The reader should bear in mind that this is a student research project and is not an official document of UBC. Furthermore, readers should bear in mind that these reports may not reflect the current status of activities at UBC. We urge you to contact the research persons mentioned in a report or the SEEDS Sustainability Program representative about the current status of the subject matter of a report".*



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# Developing Strategies to Promote Diversity in Food Garden Production: Action for Nature in a Changing Climate

Prepared for:

LFS 450

SEEDS Sustainability

UBC Food Services

UBC Botanical Garden

UBC Seeds Lending Library

Climate Crisis in Urban Biodiversity

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## EXECUTIVE SUMMARY

Biodiversity underpins the capacity of our food systems to sustain a massive amount of food production for the world's population, without having to damage the diversity of animals, plants and microorganisms at genetic, species and ecosystem levels (FAO, 2019). In the context of UBC's Vancouver campus, food systems biodiversity is an emerging topic in larger discussion of campus sustainability. In conjunction with UBC's Climate Crisis in Urban Biodiversity (CCUB)'s mission to accelerate action for climate change and biodiversity loss, there was a need to gain an understanding of the UBC community's perceptions of campus food biodiversity. Ultimately, our study aims to involve different actors in the campus food system to increase community action and engagement towards more biodiverse food garden production and culinary menu options within the UBC food system.

Applying Community-Based Action Research principles, three main surveys were designed and distributed to students, community gardeners and chefs on campus. These surveys aim to comprehend the different elements of campus food biodiversity, including the challenges and barriers of increasing food diversity, consumption behaviors of students, and to identify the motivations for different groups to enhance food diversity. Through a series of primary and secondary data collection, the concept of campus food biodiversity was defined by merging the unique perspectives of students, chefs, and community gardeners at UBC.

Our results show that students and chefs agree that UBC Food Services currently offers a diverse selection of foods, and community gardeners currently grow an average of 0-19 crops in their campus plots. However, participants identified that some of the main barriers to increasing their involvement in food biodiversity were developing peoples' interest, limited time or access to space, and knowledge-related barriers. Participants commonly identified better marketing, building strong communication networks, and increasing opportunities to engage in events as potential strategies for overcoming these barriers.

Community gardeners, students and chefs defined Campus Food Biodiversity (CFB) in terms of food, community and environment; and their perspectives were used to create a unifying holistic concept that will be used when creating our Food Systems Biodiversity Engagement Toolkit (FSBET). Identifying connections between the roles of community gardeners, chefs, and students on campus is necessary for envisioning what a biodiverse-friendly food system looks like, and how it can contribute to community resilience. Such an inclusive definition of campus food biodiversity has the potential to advance biodiversity initiatives by merging multiple perspectives and expanding the focus from food production to menu offerings and consumption practices.

Based on our findings we came up with recommendations for our clients and other campus stakeholders to enhance culinary diversity and food garden diversity. Recommendations include establishing a biodiverse food profile and UBC Food Services marketing strategy, as well as a Seeds Lending Library biodiversity program and collaborative outreach strategy. Further, we have proposed some long-term goals that can be implemented in policy such as the Food Services Procurement Guidelines and the UBC Climate Action Plan 2030 currently in development. As research on food systems biodiversity is still in its early stages, there is a call for more research, monitoring and evaluation to be done to build on our findings and support the development of biodiversity-friendly strategies on campus.

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## LIST OF ABBREVIATIONS

AMS - Alma Mater Society

CAP 2030 - Climate Action 2030

CBAR - Community- Based Action Research

CBIRD - Campus Biodiversity Initiative: Research and Demonstration

CCUB - Climate Crisis in Urban Biodiversity

CFB - Campus Food Biodiversity

FAO - United Nations' Food and Agriculture Organization

FSBET - Food Systems Biodiversity Engagement Toolkit

SDGs - Sustainable Development Goals

SEEDS - Social Ecological Economic Development Studies

TCPS 2 (2018) - Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans

UBC - University of British Columbia

UBCFSP - University of British Columbia Food System Project

UNA - University Neighborhoods Association

## 1. INTRODUCTION

### 1.1 RESEARCH TOPIC

The main goal of this research project is to develop a unifying definition of 'campus food biodiversity' as there is a knowledge gap on the role of biodiversity within food systems, especially within the campus context. There are many papers which highlight the role of biodiversity in nutritional health and food security at global scales (Toledo *et al.*, 2006; Burlingame *et al.*, 2009; El Mujtar *et al.*, 2019), yet there are little to no papers which focus on the role of biodiversity within food systems at local scale such as the campus context. Therefore, this project provides an opportunity to address the knowledge gap on the role of biodiversity (i.e., crop diversity) within the University of British Columbia (UBC) campus food system.

There are two opportunities that this project addresses, the first is the development of the foundations for a Food Systems Biodiversity Engagement Toolkit (FSBET) which will enhance the engagement of UBC students, chefs, and community gardeners in enhancing biodiversity in UBC's food system. The development of the toolkit is led by students from the Faculty of Land and Food Systems in collaboration with the UBC Food Services, UBC Botanical Garden, Seeds Lending Library (Education Library), and Climate Crisis in Urban Biodiversity (CCUB). The FSBET considers the perspectives of UBC students, chefs, and community gardeners who participate in the campus food system, which contributes to the potential to increase biodiversity in the production and consumption components of the food system. Since food consumption is the single most important driver of biodiversity loss on a global scale (Wilting *et al.*, 2017), safeguarding biodiversity at this community scale could greatly strengthen the sustainability of UBC's food system.

The second opportunity is increasing the resilience of UBC's food system - especially in systems of food production - in the face of climate change by supporting biodiversity. Biodiversity is arguably the most important component of any food system as they provide provisioning services (i.e., food), regulating services (i.e., climate and disease regulation), and supporting services (i.e., nutrient cycling and soil formation) (Alcamo *et al.*, 2003). These services underpin the food production component of any food system and without them, food systems

could potentially collapse. Therefore, by increasing the crop diversity within food production systems at UBC, key ecosystem services such as nutrient cycling, pollination, and pest control can be reintroduced to improve the resilience of UBC's food system.

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### 1.1.1 SIGNIFICANCE OF BIODIVERSITY IN AGRICULTURAL SYSTEMS

The United Nations' Food and Agriculture Organization (FAO) describes biodiversity for food and agriculture as the interaction between the variety of life at genetic, species and ecosystem levels in our food systems (FAO, 2019). Biodiversity in food and agriculture creates the foundation for the progressive development of any community (FAO, 2019). Recent scientific evidence has shown the detrimental impacts of climate change on biodiversity, caused by the human domination of critical Earth ecosystem processes (Chapin *et al.*, 2020). From an agricultural perspective, growing only a certain selection of crops and increasing the intensity of production is resulting in the decline of biodiversity, which is reflected in the loss of ecosystem services; crops are becoming more susceptible to the increase in disease and pest outbreaks due to climate change (Government of Canada, n.d.; Tirado, 2008; Whitehorn *et al.*, 2018; FAO, 2019). Therefore, safeguarding biodiversity should be a priority because it is understood to be one of the greatest tools humans have for adaptation and resilience to climate change (Newbold *et al.*, 2015).

## 1.2 RESEARCH RELEVANCE

The world depends on nine plant species (sugar cane, maize, rice, wheat, potatoes, soybeans, oil-palm, sugar beet and cassava) for 66% of the crop production, out of approximately 6,000 plants which have been cultivated for food (FAO, 2019). Out of these crops, rice, maize and wheat provide two-thirds of the world's caloric intake (Reeves *et al.*, 2016), while fruits, vegetables, and proteins are not being produced at sufficient quantities which meet the nutritional needs of the world's growing population (Bahadur *et al.*, 2018). The homogenization and intensification of these crops in global agricultural systems has decreased the biodiversity of crops and led to the extensive use of external inputs like fertilizers and pesticides to deal with low soil fertility and increased pest outbreaks (Tirado, 2008; Whitehorn *et al.*, 2018; FAO, 2019). This dependence on external inputs increases the vulnerability of the global food system as they negatively impact the myriad of organisms that



supports and enhances the resilience of agricultural systems through ecosystem services like pollination, nutrient cycling, and biological control (Richardson, 2010), which are important in the face of climate change (O’Riordan & Stoll-Kleemann, 2002). In addition, the loss of crop biodiversity has driven the decline of food diversity in several cultures (Webb & Eiselen, 2009). Biodiversity is a fundamental component of food diversity because it encompasses the variety of species consumed as food like fruits, vegetables, and nuts. Thus, the loss of biodiversity has led to the loss of various traditional crops rich in important micronutrients like zinc and iron (Webb & Eiselen, 2009).

As a leading academic institution in advancing climate action and research in sustainability, UBC can potentially become a hub of resources in understanding the role and contributions of biodiversity to campus health and climate action. For example, the UBC Food System Project (UBCFSP), Campus Biodiversity Initiative: Research and Demonstration (CBIRD), and Climate Crisis in Urban Biodiversity (CCUB) initiatives provide the stepping stones which could inform and advance biodiversity in UBC’s emerging Climate Action Plan 2030. Research opportunities arising from these projects are advantageous to help inform the current practices of campus food systems and initiatives to enhance biodiversity on campus.

Given UBC’s current commitments and actions in sustainability initiatives such as the Climate Action Plan, an opportunity arises to expand these commitments into other intersectional issues such as biodiversity. In order to advance making these connections, there is a need to define terms such as “food diversity” and “campus food biodiversity” based on the perspectives of UBC’s community members who are involved in UBC’s food system. The groups we will target are UBC students, chefs, and community gardeners. An inclusive definition of campus food biodiversity will likely advance UBC biodiversity initiatives by merging multiple perspectives and expanding the focus on food garden production, menu selection, and consumption practices within UBC’s food system.

In collaboration with the Climate Crisis in Urban Biodiversity (CCUB), UBC Seeds Lending Library, UBC Botanical Gardens and UBC Food Services, we are in the process of co-developing the foundations of a Food Systems Biodiversity Engagement Toolkit (FSBET) to further enhance the UBC community’s knowledge and action towards campus food biodiversity. The toolkit will help the UBC community by conveying relevant skills and

benefits associated with growing, cooking, and eating biodiverse foods. Furthermore, this project will develop recommendations for increasing biodiversity in UBC's food system through UBC's Climate Action Plan 2030 and the UBC Food Services Procurement Guidelines.

### 1.3 PROJECT CONTEXT

Since 2000, the UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program has developed collaborative projects between students, faculty, staff and community partners to advance sustainability on local and global platforms (UBC Sustainability, 2019). In 2001, SEEDS in partnership with the Faculty of Land and Food Systems to create the UBC Food System Project (UBCFSP) with the goal of identifying and implementing transitions towards food system sustainability using Community-Based Action Research (Rojas et al., 2007). This research project will be part of the UBCFSP and contribute toward more than 260 projects that advance sustainability on campus (UBC Sustainability, 2020).

Previous projects that are part of the UBC Food System Project (UBCFSP) have taken steps towards enhancing biodiversity on campus which could inform the United Nations (UN) commitments towards the following Sustainable Development Goals (SDGs): Goal 1 No Poverty; Goal 2 Zero Hunger; Goal 12 Responsible Consumption and Production; Goal 13 Climate Action; and Goal 15 Life on Land (UN, n.d.). Biodiversity plays a key role in each of these goals. For SDG 1, SDG 2, and SDG 13 respectively, biodiversity aids in the elimination of poverty and hunger, furthers climate action by contributing to the resilience of agricultural systems, and diversifies farmers' income and peoples' diet through species genetic diversity (Convention on Biological Diversity, 2019). For SDG 12, biodiversity contributes to this goal by providing ecosystem services and improving the overall sustainability and productivity of agricultural systems (Dawson *et al.*, 2019). SDG 15 is directly related to the conservation of biodiversity (UN, n.d.). Ng *et al.*, (2018) is an example of a previous SEEDS project which contributed to at least one of these goals. In 2018, Ng *et al.*, performed a baseline analysis of the plant diversity at UBC's community gardens with the goal of understanding the existing level of plant diversity in campus community gardens. The research aimed to provide a way for future biodiversity projects to measure their progress based on the initial level of plant diversity that Ng *et al.*, (2018) found. In 2019, Zeng *et al.*, addressed an

important issue regarding the lack of communication between the UBC campus community garden groups which resulted in the high turnover of volunteers, information gaps and lack of shared equipment between gardens. Zeng *et al.*, (2019) executed a workshop that was well appreciated because UBC community gardeners were able to exchange their knowledge and expertise on various topics. The findings from their workshop indicated that participants had an interest to increase biodiversity and food productivity, through technical workshops or seminars related to growing fungus, overwintering crops, and seed harvesting. Based on the progress made by these past projects, we identified an opportunity to explore the linkages between food and biodiversity based on the perspectives of the people interacting with the UBC food system.

The development of this project was driven by the need to further enhance biodiversity in UBC's food systems. The main advantage of exploring the food-biodiversity link within the campus food system is that we are able to expand the focus on food production, studied by previous projects (Ng *et al.*, 2018; Zeng *et al.*, 2019), and incorporate other aspects of the campus food system that have not been studied yet such as culinary practices and food consumption. However, because the exploration of this food-biodiversity link requires a bigger scope within the campus food system, there are several stakeholders involved in this project. Our stakeholders are the Residence Dining (UBC Food Services), UBC Botanical Garden, Seeds Lending Library (Education Library), and the Climate Crisis in Urban Biodiversity (CCUB) (SEEDS Sustainability Program). Despite each stakeholder bearing unique perspectives on the initial outcomes of this project, the synergistic points of agreement between different stakeholder groups revolved around 1) increased comprehension of what "food biodiversity" means for community gardeners, students, and chefs, and 2) use their perspectives to create a Food Systems Biodiversity Engagement Toolkit (FSBET) that can be used to enhance biodiversity at UBC.

The Food Systems Biodiversity Engagement Toolkit (FSBET) will be the main resource generated and is targeted towards community gardeners and chefs, however it can also be used by students. It will incorporate information from participants' survey responses, campus biodiversity resources, and relevant online sources that enhance the biodiversity of food garden production and culinary menu options within UBC's food system. The specific resources are highlighted in the Secondary Data Collection and Research Methods section.

## 1.4 PROJECT PURPOSE, GOALS AND OBJECTIVES

The purpose of this project is to enhance community engagement and action in the transformation of the UBC campus food system towards more biodiverse food production and consumption. The project goals include: 1) to interpret the term “campus food biodiversity” and 2) to increase the knowledge and action of campus food garden diversity, seed sharing and saving practices, and diverse consumption practices.

The project objectives include: 1) to elicit the perspectives of UBC students, chefs, and community gardeners on ecological, cultural, and culinary benefits of biodiversity that can inform a holistic definition of “campus food biodiversity”; 2) to develop a food systems biodiversity engagement toolkit to provide practical and educational resources for enhancing biodiversity within UBC’s food garden production and UBC Food Services; and 3) to develop recommendations for increasing biodiversity in UBC’s food system, informing UBC’s Climate Action Plan 2030 and the UBC Food Services Procurement Guidelines.

## 2. METHODOLOGY AND METHODS

### 2.1 RESEARCH METHODOLOGY

In this study we used the Community-Based Action Research (CBAR) methodology which is a consensual research approach where positive working relationships and cooperation are the main focus of an inquiry for the benefit of all parties (Juergensmeyer, 2011). We designed our research to integrate and consolidate targeted communities’ input including community gardeners, culinary staff, and UBC students to ensure their understanding of food biodiversity is approached and incorporated in the development of the toolkit. Through the survey design we facilitated the process of bringing community knowledge forward, making this project contextual and community-based. In accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2 (2018)), we secured informed consent from survey participants (see Appendix B.1 for details).

### 2.2 RESEARCH METHODS

Through surveys, we examined community gardeners’, chefs’, and students’ demographics, attitudes, and willingness to try eating or making a diverse selection of cuisines in an attempt to examine their current

understanding of the term “food biodiversity”. Students were asked about their dietary habits and food purchases on and off-campus. Chefs were asked about the motivations behind creating diverse dishes. Community gardeners were asked about the diversity of plant species grown at their community gardens. We collected this information to answer the question “*What does food biodiversity mean on campus?*” Overall, the objective of our research methodology was to uncover the existing knowledge about campus food biodiversity and identify ways in which our target groups could support a diverse range of food consumption, recipes, and planting.

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### 2.2.1 SECONDARY DATA COLLECTION RESEARCH METHODS

Secondary data collection methods included internet-based research on a macro- and micro-level to identify key challenges in biodiverse food systems practices, government policies, strategies, and frameworks in Vancouver and other cities that help upscale food diversity through urban agriculture. Specifically, we conducted a practitioner literature review on food issues related to our topic to study and identify best practices in food biodiversity at local and global scales. Only published peer-reviewed and scholarly research articles were selected for literature review and secondary data collection from scientific journals such as *Journal of Agriculture*, *Journal of Field Actions*, and *Journal of American Planning Association*. We studied published UBC food systems projects (UBCFSP) and previous Social Ecological Economic Development Studies (SEEDS) reports for better comprehensive and contextual learning of the topic. The keywords used to find relevant research include, but are not limited to: “food diversity”; “urban agriculture”; “plant diversity”; “agrobiodiversity”; and “policies”. The type of data collected encompassed institutional research projects from university departments, government official plans and policy documents, as well as qualitative and quantitative research.

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### 2.2.2 PRIMARY DATA COLLECTION RESEARCH METHODS

To collect primary data from the three target groups (UBC students, chefs, and community gardeners), we investigated options with our clients and landed on using online surveys as the primary tool for collecting data

given that electronic methods were our only option during the COVID-19 pandemic.

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### 2.2.3 SURVEY DESIGN

The primary data collection method was conducted using Qualtrics (<https://www.qualtrics.com>) which is an online UBC Survey Tool. This method allowed for the creation of multiple-choice, conditional, and statistical questions which made the survey short and convenient. Additionally, we took advantage of Qualtrics features to add graphics which ultimately made the survey more informative and engaging. Hosting online surveys was an efficient way to collect data without the researchers' administration or scheduled meetings with participants. We anticipated this would increase ease of access and participation rates.

Each of the surveys consisted of 3 question blocks, with the first and last being demographics and food biodiversity questions which were consistent amongst the three groups. The demographic block inquired information about age, gender, and ethnicity. Participants could choose "prefer not to answer" for demographic questions given that they may not feel comfortable disclosing certain information. The second block focused on audience-specific questions. For students, a set of behavioral questions examined preferences for trying and consuming a diverse selection of food and understanding how factors such as taste, price, and location would impact their decisions. Chefs were asked similar questions regarding the creation of diverse food dishes, inspirations, and techniques. Community gardeners were asked about the experience of planting diverse plant species, reasons for growing different plants, and their knowledge and usage of seed saving and sharing. All audiences were asked if they had heard of or used the UBC Seeds Lending Library. The last block targeted all three groups to gain more descriptive and in-depth discussions about "what campus biodiversity means to you". This section also included additional writing spaces to identify barriers and recommendations for enhancing biodiversity.

The scope of our survey was UBC community members. Therefore, participants had to have affiliation with UBC as students or staff. Being a part of UBC residence was an additional requirement for students because they usually have meal plans and dine-in at UBC food services regularly. We set a target of on average 10

responses from chefs and gardeners, and over 30 responses from students. However, since we aimed to receive as many responses as possible for fair and accurate representation from all participants, we were unable to keep a record of the total population that received the survey in order to determine response rate.

### 2.3 METHODS OF ADMINISTRATION

Due to COVID-19 restrictions on campus that prevented in-person contact for coursework purposes, we were unable to conduct in-person interviews with our targeted groups. In addition, our research was also aimed to incorporate a broad group of participants within a restricted time frame of having only 2-3 weeks for data collection. Therefore, Qualtrics surveys was the most feasible method to reach a wide range of community members within a short period of time. For student groups, Qualtrics surveys were distributed through various social media platforms such as LFS Facebook groups, the Roots on the Roof Facebook page, UBC Class of 2021, 2022, and 2024 Facebook groups, UBC Residences Facebook groups, and the LFS and UBC Farm Newsletter. For community gardeners, Qualtrics surveys were distributed via email through contacts that were provided by our client, Laura Arango. Surveys were also posted on the Acadia Park Community Gardener Facebook group, and the Roots on the Roof Facebook page. For chefs, the Qualtrics survey was distributed by Brad Vigue, the Executive Chef for UBC Residence Dining to his fellow colleagues. The Qualtrics survey was opened for 18 days, from March 12 - March 30.

## 3. RESULTS

### 3.1 REVIEW OF RELEVANT PREVIOUS UBC PROJECTS

We studied previous UBC biodiversity projects to understand the context of our work on campus and improve our research based on the “lessons learned” that they identified. We found that most projects looking at biodiversity were focused on biodiversity in food production (i.e mainly studying crop diversity and agrobiodiversity) (Ng *et al.*, 2018; Zeng *et al.*, 2019). The baseline for crop diversity was identified by Ng *et al.*, (2018), and it was found that community gardeners at UBC grew an average of 9.5 crops in their personal plot in 2018. They also found that most community gardeners were Caucasian females and their motivations behind

gardening were due to “enjoyment” (Ng *et al.*, 2018). Zeng *et al.*, (2019) identified that community gardeners were interested in learning more about seed harvesting through technical workshops and seminars. They also highlighted some challenges of developing a framework for a “Harvest Tool” -which involves the users recording and weighing crop yields- that gardeners would be interested in using (Zeng *et al.*, 2019). A possible reason for that the “Harvest Tool” was not greatly received by gardeners is that Zeng *et al.*, (2019) had a framework deeply rooted in academic literature and did not encompass gardeners’ perspectives on what they would like to have in this tool. Both studies also mentioned that there were communication challenges when contacting gardeners, and as a result their surveys had less than 30 responses (Ng *et al.*, 2018; Zeng *et al.*, 2019).

In order to develop tools rooted in the perspectives of gardeners to benefit them most, these previous studies have also recommended the need to increase focus on understanding what “food plant biodiversity” and “agrobiodiversity” means to community gardeners. Additionally, both studies pointed out that gardeners really enjoyed having technical workshops where they could meet with other gardeners, but they also highlighted the need for a stronger platform or communication network where they can exchange knowledge with one another (Ng *et al.*, 2018; Zeng *et al.*, 2019).

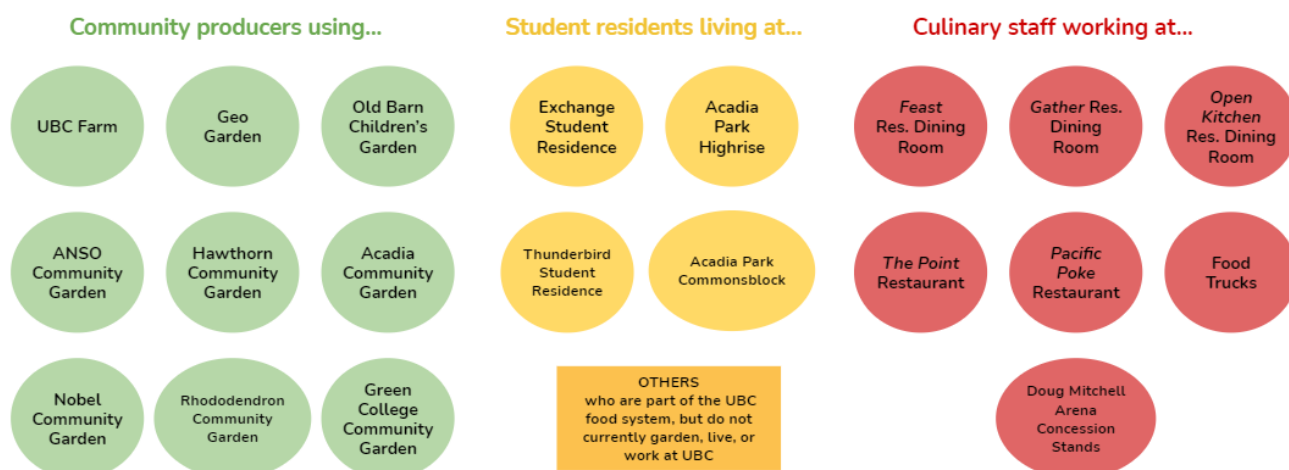
### 3.2 ONLINE SURVEYS

For the purpose of this project, community gardener responses include UBC Farmers. Our online survey recorded a total of 105 responses consisting of 55 community gardeners, 16 chefs, and 34 students. In summary, participants were reported from 9 community gardens, 4 student residences, and 7 dining establishments at UBC, as well as other participants who are part of the UBC food system but are not currently at UBC (Figure 1).

Considering the relatively smaller population size of chefs and community gardeners, we believe the responses we obtained are representative of these audiences. Conversely, we did not obtain many responses from students to have a representative sample size for this large audience. Due to the unsuccessful survey distribution channels through UBC Residence Life, survey distribution for students was limited to newsletters and social media platforms such as Facebook.



## Who was present in our survey?



**Total = 55 Community Gardeners & Farmers + 34 Students + 16 Culinary Staff = 105 responses**

Figure 1. Total responses from community gardeners, students, and chefs; and UBC establishments they represent.

### 3.2.1 DEMOGRAPHICS OF PARTICIPANTS

The demographic information between audience groups was distinct, and each audience had specific demographic trends (Figures 2 & 3). The community gardener audience had a significantly greater presence of females (64%) and Caucasians (72%). These results are consistent with Ng *et al.*, (2018) and match the demographic trend of sustainable producers in BC (Gibb & Wittman, 2013). The students' audience had a more evenly distributed ethnic diversity with a higher presence of East Asians (41%), followed by Caucasians (28%), and South Asians/Indo-Pakistanis (11%). However, almost all participants in this audience were females (93%). The demographic trends in ethnicity of the student population are similar to the trends of UBC domestic students in recent years (UBC, 2020). However, the lack of male representation in the student audience needs to be considered when analyzing results of this group because it may skew results (Nisiforou & Charalambides, 2012). The culinary staff audience had a more equivalent presence of males (56%) and females (38%) compared to the other groups, but there was a greater presence of Caucasians (60%) and Latin Americans (20%). None of the respondents were identified as Black.

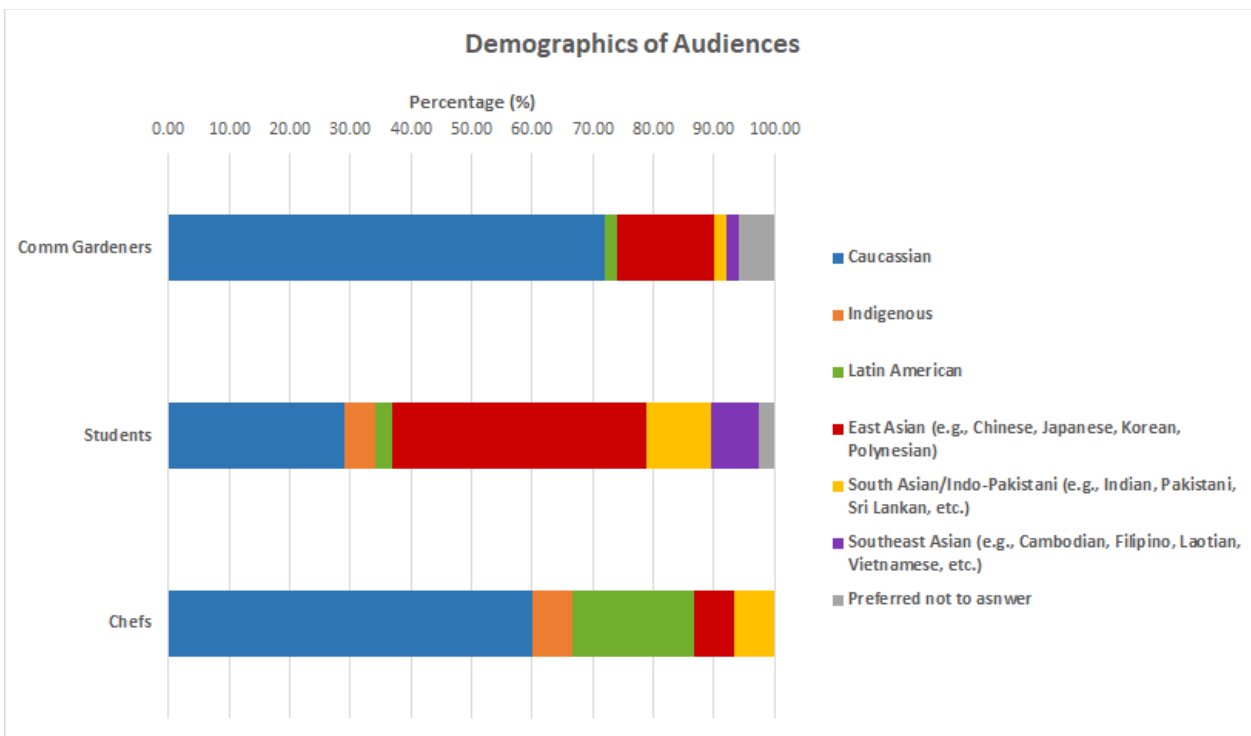


Figure 2. Demographics of community gardeners (n=55), students (n=34), and chefs (n=16) based on ethnicity.

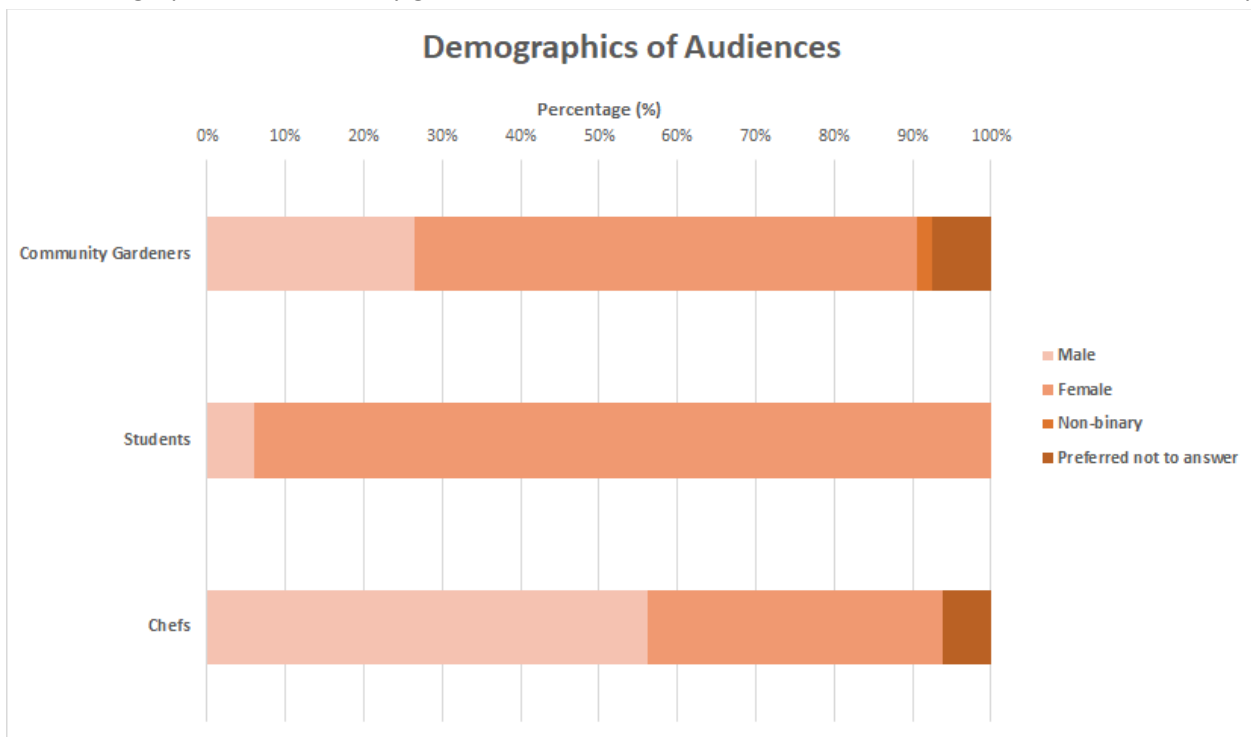


Figure 3. Demographics of community gardeners (n=55), students (n=34), and chefs (n=16) based on gender.

### 3.2.2 PERCEPTION TOWARDS CAMPUS FOOD BIODIVERSITY

In this section, our survey results show that most students (65%) and all chefs (100%) agree that UBC Food services serves a diverse selection of nuts, fruits, vegetables, and grains. It also shows that the diversity of

food grown by most gardeners and farmers (86%) consisted of 0 - 19 different crop varieties last season. Additionally, when participants were asked to define campus food biodiversity (CFB) based on their perspective, there were several thematic overlaps between audiences (Figure 4). Students and community gardeners associated CFB with diversity in plants, diversity in wildlife, and the idea of supporting a positive cohabitation of humans with these living organisms. On the other hand, students and chefs associated CFB with having more education that focused on food and dietary diversity, biodiverse green spaces, and diversity in human views and perspectives. However, all three audiences strongly associated CFB with biodiversity in food consumption, inclusivity of many cultures, and ecosystem resilience that strengthens our campus food system (Figure 4).

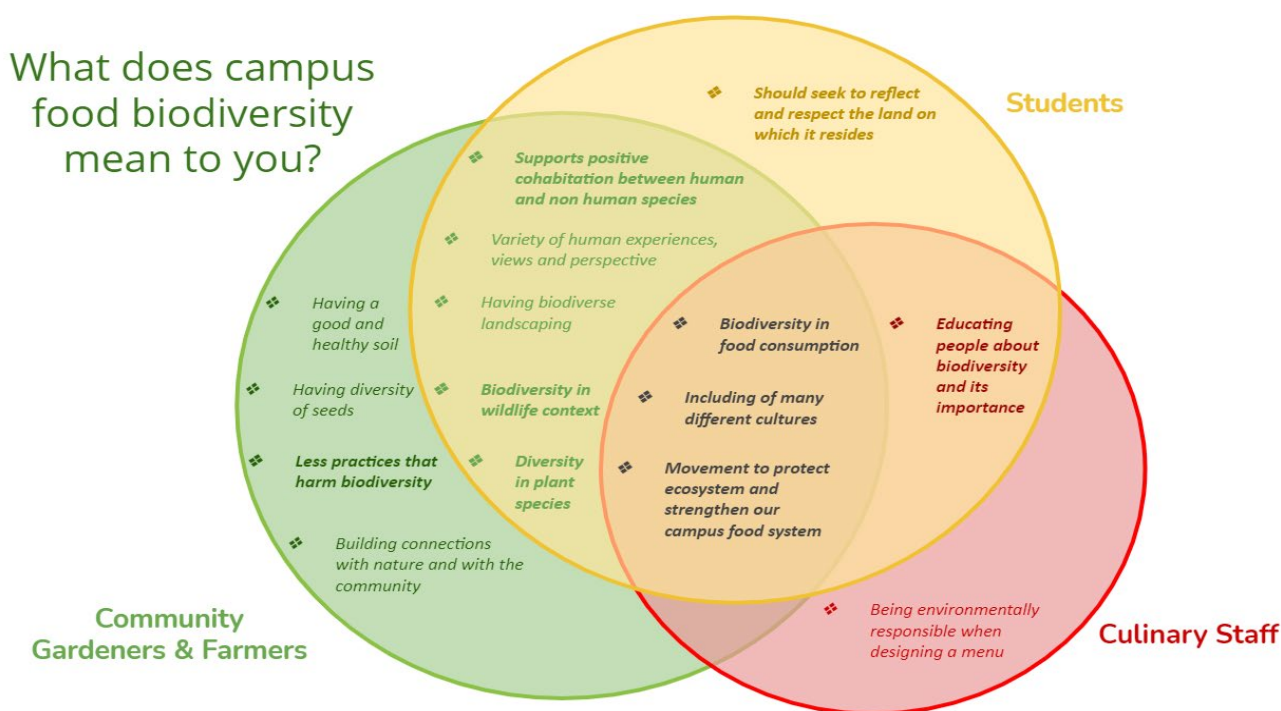


Figure 4. Compilation of recurring thematic codes found in responses to the open-ended question: “As a community gardener, student, OR chef, what does campus biodiversity mean to you?” Thematic codes shown in each group were mentioned least 10% of the time in all responses. Codes found in higher frequency than others (>25% occurrence) are bolded. For this diagram: N = 70; Community Gardeners (n=31), Students (n=27), and Chefs (n=12).

Based on the coded responses, our team developed a holistic definition of campus food biodiversity (Figure 5). This definition encompasses three main overarching themes found in the participants’ responses: Food, Community, and Environment. Each of these themes was present consistently in over 90% of responses.

Additionally, most of the wording utilized in this holistic definition is verbatim from participants and only grammatical and syntax modifications were made by our team to improve the sentence flow.

### What is campus food biodiversity?

*“Within the context of UBC, campus food biodiversity refers to:*

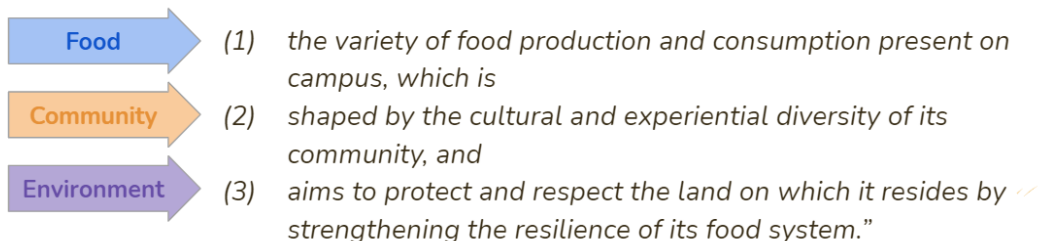


Figure 5. Holistic definition for Campus Food Biodiversity (CFB) developed by our team. This definition aims to compile the perspectives of Community Gardeners, Students, and Chefs to have a unifying concept of campus food biodiversity within the context of UBC.

### 3.2.3 KNOWLEDGE GAPS IDENTIFIED

Responses	Experience Level		
	Novice 0-2 years	Intermediate 3-6 years	Veteran 7+ years
Yes, I have used the Seeds Lending Library	3.0	4.0	1.0
No, I have not used the Seeds Lending Library	5.0	7.0	14.0
Yes, I consistently save seeds and use them	3.0	5.0	12.0
No, but I am interested in trying	4.0	5.0	1.0
No, I don't know what seed saving is	1.0	1.0	2.0
Yes, I have shared my seeds	5.0	11.0	16.0
Yes, I have shared my seeds using the Seeds Lending Library at UBC	2.0	1.0	1.0
No, I keep the saved seeds for personal use only	1.0	0.0	3.0
I have not saved seeds	2.0	4.0	3.0

Table 1. Results from Questions 5, 6, & 7 from the community gardeners’ survey: Question 5- “Have you heard of the UBC Seeds Lending Library?”; Question 6- “Do you have experience in seed saving?”; and Question 7- “Have you shared or exchanged the seeds you saved with anyone else?”. For this table n = 55.

Table 1 is a summary of the results from a total of 34 responses collected from the community gardeners’ group. As seen in Figure 2, there is a positive correlation between gardening experience in years and engagement in seed saving and seed sharing activities amongst community gardeners at UBC. For the purpose of analysis in this report, veteran gardeners are considered individuals with 7+ years of experiences; intermediate gardeners are individuals reported with 3-6 years of experiences; and novice gardeners are individuals with 0-2 years of

experiences. Data (Table 1, Row 3, Q6) shows that veteran gardeners have greater engagement in seed saving and seed sharing activities, while a poorer engagement was recorded by the novice group. Among all three gardener groups, intermediate gardeners have used the UBC Seeds Lending Library the most. However, our data (Table 1, Row 6, Q7) also indicates that UBC community gardeners, especially the veteran gardeners, have generally not utilised the UBC Seeds Lending Library as their seed resource. Moreover, responses from **Question 6** (Table 1, Row 4) also indicated the desire of novice gardeners to acquire seed saving skills and to engage in more seed sharing activities.

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#### 3.2.4 MOTIVATIONS FOR INCREASING FOOD DIVERSITY

To analyse the motivations for three different groups (UBC students, chefs, and community gardeners) to increase their food diversity, we first defined food diversity using existing literature and online survey results. From Lee (2020), food diversity encompasses several components that are associated to food security and food literature values as summarised as below:

1. Food diversity is the different food or food groups consumed over a given reference period
2. Food diversity is the variety of crops grown on a farm/food garden
3. Food diversity is the representation of all cuisines and culture
4. Food diversity is the array of nutrients needs for a full-and well-rounded balanced diet
5. Food diversity is part of the campus food biodiversity.

Using the definition of food diversity as outlined above, the following tables, Table 1, Table 2 and Table 3 illustrate the responses that were obtained through the online surveys. The questions in the following charts were designed to be a ranking format, where participants are required to rank their choices based on the options provided.

Why do you plant various species in your garden	Rank
Cooking and eating preferences	1
Nutritional value	2
Discovering new flavours	3
Supporting pollinators	4
Soil health and maintenance	5
Companion planting	6
Maintaining heritage varieties	7
Aesthetic value	8
Pest management	9

Table 2. Results of Question 10- “What is your motivation for growing different species in your garden?”, taken from the community gardener survey. For this table n = 55.

From Table 2, community gardeners ranked their top factors to increase crop diversity in their respective gardens to be associated with personal cooking and eating preferences, nutritional value of the foods and the flavours of the foods. The intermediate ranked options (Rank 4-7) were more related to supporting ecosystem health. For instance, species were planted for enhancing pollinator habitats, supporting soil health, and conserving certain plant varieties. The options that are least popular include planting diverse varieties for aesthetic values and pest management purposes.

What makes you create new dishes	Rank
UBC Food Services 'Food Vision and Values' guidelines	1
Access to seasonally available produce	2
Given the opportunity to bring more creativity/meaning into dishes	4
Inspiration from other dishes you've tried	5
Inspiration from other chefs	6

Table 3. Results of Question 6- “In your UBC kitchen, what motivates you to try new recipes with less common ingredients?”, taken from the chefs survey. For this table n = 16.

From Table 3, the UBC Food Services 'Food Vision and Values' guidelines was a primary factor that motivates chefs at the UBC Food Services to create new dishes using unfamiliar ingredients. This was followed by the access to seasonality of the produce, and the opportunity in the kitchen to create more meaningful dishes. As shown, chefs are shown to be least inspired by other dishes and/or other chefs.

What makes you try new dishes	Ranks
Free tastings	1
Like to try new foods	2
Friends or family member recommendation	3
Attractive appeal or look	4
Promotional item on the menu	5
Social media trend (pictures or videos)	6
Meal Kit plans such as Hellofresh, Goodfood etc	7

Table 4. Results of Question 6- "What makes you step out of your 'comfort' zone and try a new dish prepared with less common ingredients/vegetables (i.e., crops which are not found in typical corporate grocery stores or crops which are culturally significant but are less known)?", taken from the student survey. For this table n = 34.

From Table 4, students were primarily attracted to free tastings as the main motivation to try new foods on campus. This was followed by their taste preferences and influence by friends and family. The intermediate-ranked options are the look and appeal of the food, the menu display and social media trends. Meal Kit plans were the least popular option amongst students who responded to our survey.

What makes you continue eating new dishes	Rank
Taste	1
Price	2
Nutritional value	3
Proximity to food source	4
Ease of cooking it at home (replicating dish)	5
Convenience of food premises operating hours	6
Ingredients were locally sourced (BC or Canada)	7
Ingredients were grown organically	8
Ingredients were grown using sustainable agricultural practices (i.e. not from monocultures)	9

Table 5. Results of Question 7- "What would make you more likely to continue eating these new dishes?", taken from the student survey. For this table n = 34.

From Table 5, the results for reasons that motivate student groups to continue eating new foods were echoed in the community gardener survey (Figure 2). Taste was a key factor in influencing students’ dietary options, followed by price and nutritional value. The factors that ranked bottom include the sources of ingredients, such as ingredients that were locally sourced, grown organically or using sustainable agricultural practices.

### 3.3 BARRIERS AND STRATEGIES IDENTIFIED BY THE COMMUNITY

Community gardeners and culinary staff identified several barriers to increasing UBC food biodiversity (Figure 6). Both audiences seemed to agree that developing people’s interest to eat or grow new foods is a concern as well as limited time available since it takes time to either grow or just develop recipes with uncommon ingredients. Additionally, both audiences believe that better marketing strategies to promote new foods, as well as having a strong communication network, and having more opportunities to engage in biodiversity through various events are some potential strategies to enhance biodiversity on campus (Figure 7).

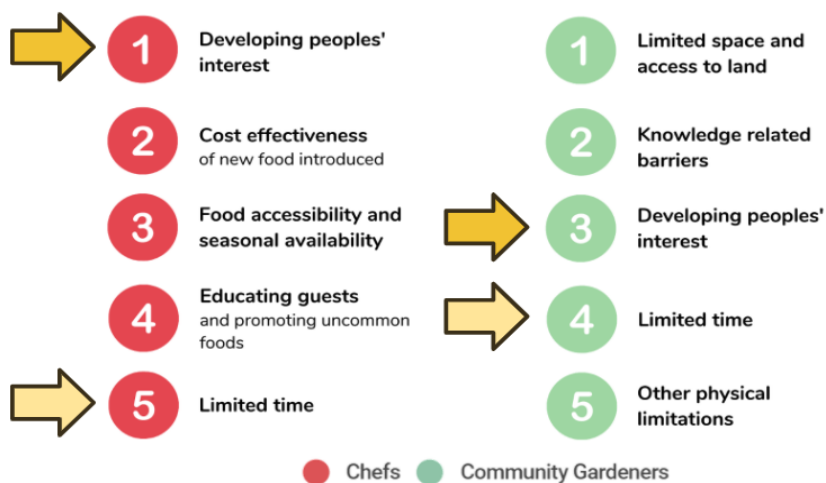


Figure 6. Top 5 barriers to increasing UBC food biodiversity expressed by community gardeners and chefs. Arrows point to where there are commonalities in participant responses.





Figure 7. Top 5 strategies for increasing UBC food biodiversity expressed by community gardeners and chefs. Arrows point to where there are commonalities in participant responses.

## 4. DISCUSSION

### 4.1 PERCEPTUAL BASELINE

Understanding the current level of food biodiversity perceived by community gardeners, students, and chefs is critical because it allows future projects to measure any progress that is made. For example, when comparing the level of crop biodiversity found in our survey with the level found in Ng *et al.*, (2018), there is relatively no change in the average number of crop varieties grown by community gardeners. Additionally, despite students and chefs agreeing that a diverse selection of foods is served by UBC Food Services, there were several strategies proposed by chefs to increase UBC food biodiversity. This suggests that the desired or ideal level of food biodiversity on campus has not been achieved yet, and there is an opportunity to utilize the gardeners, chefs, and students' motivations to create viable actions towards a more food biodiverse campus.

The definition of campus food biodiversity (CBF) we developed in this study will serve as a unifying concept across community gardeners, students, and chefs. This definition is important because it is the main stepping stone of our Food Systems Biodiversity Engagement Toolkit (FSBET) that will be rooted in the context of UBC and it will encompass the perspectives of the UBC community. Additionally, the links found between different groups (Figure 4) will allow us to create recommendations that bridge across similar perceptions towards CBF. One key aspect that appeared in our results and was not really expected by our team was the appearance of “diversity of people and community” in the CBF definition. Since biodiversity or food biodiversity is

often described in terms of the number of plant species and/or the number of animal species that interact with food and the environment (FAO, 2019). However, the perspectives of the UBC community go beyond this scope and highlight the importance of people diversity in the community. For that reason, it is vital that any recommendation or strategy applied to enhance CFB has to incorporate *food, the community, and the environment* since these are the main overarching themes identified by UBC community gardeners, students and chefs (Figure 5).

#### 4.2 KNOWLEDGE GAPS

Through our survey results, we identified a knowledge gap between the veteran gardeners (7+ years) and the novice gardeners (0-2 years). While the veteran gardeners are active in numerous seed saving initiatives within the boundary of their gardens and often share their seeds with friends and families within their social bubble, novice gardeners appeared to lack the knowledge to do so. From survey responses, novice gardeners have indeed shown interest in seed-saving initiatives but were not able to find guidance. This suggests that a communication network should be established in order to connect community gardeners from all levels of experiences.

The concept of community gardens allows food growers to plant and harvest produce for personal and household consumption. This may explain why individual cooking and eating preferences, nutritional value and taste of food were the main factors for community gardeners in making considerations for the choice of plants in their gardens. Given that a networking platform is established to connect gardeners of different cultural backgrounds and experiences, gardeners may become more motivated to increase the diversity of edible plants in their gardens as they learn more about ways to prepare and cook unfamiliar foods from their fellow gardeners.

#### 4.3 MOTIVATIONS FOR INCREASING FOOD BIODIVERSITY

Our survey results indicated that free tastings provided the biggest drive for students to try new dishes. This result is consistent with the findings of Pinsker (2014) which explains the psychology behind free food samples. The phenomenon of one being more attracted and committed to free samples or free tastings is known as the zero-price effect, which has led to populations preferring bland foods over tastier alternatives. Adopted by

Costco in their food marketing strategies, the concept of 'free' may be one of the most effective methods of promoting an item that is not common for an individual or their households (Shampanier, 2007; Schiller, 2015).

Subsequently, the motivation for students to continue trying new dishes was similar to the motivation behind community gardeners' planting options in their gardens, which is taste. There appears to be a significant range of responses regarding taste, affordability and nutritional value for the motivation to increase food diversity in community gardeners and in student groups. Echoing Lin *et al.*, (2020), our analysis has also shown that the students' decisions in managing the diversity of their diets are largely affected by food price and quality. Food affordability is defined as the cost of the diet of a household relative to the household's income, which may affect food security at all levels (Mudrak *et al.*, 2018). In UBC Wellbeing's (n.d.) report, 37% of UBC undergraduate students are food insecure, as they do not earn adequate income to afford healthy and appropriate food on an average basis. Thus, it is no surprise that students' food purchasing behaviours are significantly linked to price point of products. Therefore, foods sold on campus must be within an affordable price range for students. When giving free tastings for a new food product, it is important to incorporate feedback from students expressing their tasting experiences and suggestions for a price range that is within their willingness to pay because efforts to incorporate more biodiverse food options on campus are strongly influenced by students' purchasing behaviours.

Depending on the meal kit types and customers' dietary requirements, meal kit plans are usually an expensive subscription, ranging from 10CAD to 25CAD per meal, with a minimum requirement of 6 meals per delivery (Coppolino, 2018; Omololu, 2020). Without promotions and/or discount codes being applied with the purchase, meal kit plans are often an unaffordable purchase for students in the long-term. Therefore, this may explain why meal kit plans were ranked last in students' responses.

In addition, ingredients that are locally sourced, grown organically and obtained using grown sustainable agricultural practices were also ranked bottom for what makes them continue eating new dishes. In general, food produce that are labelled to be more environmentally friendly or sustainably produced such as 'organic', 'locally-sourced', and 'locally-grown', are conjectured to be more expensive than conventionally farmed produce. For instance, consumers have expressed hesitancy in purchasing local foods due to the higher price range than non-

local foods (Albrecht & Smithers, 2018; Charlebois, 2018). In Ontario, Canada, this notion has been challenged by recent research with evidence suggesting that local foods are usually cheaper than non-local foods, depending on seasonal variability and product types (Donaher & Lynes, 2017). In the same study, the results showed that despite organic foods being pricier than local foods, these two groups are often regarded as “the more expensive” by consumers. It was reported that general consumers do not realize the price and product distinction between local foods versus organic foods. These findings suggest that more conversations and discussions evolving the understanding of food prices in different contexts such as ‘local’ and ‘organic’ are needed to strengthen the UBC community’s understanding towards the true value of foods in order to gain their commitment to enhancing campus food biodiversity.

Actions to improve UBC campus food biodiversity would require students to not only participate in the food production and preparation process, but also to support their willingness to purchase and consume local foods. Since the options for each ranking question is unique to each targeted group in this study, further research is needed to involve more perspectives from other groups within the UBC community as well, with the study sample not limited to the students, chefs and community gardeners.

#### 4.4 BARRIERS AND STRATEGIES

The barriers and strategies identified from community gardeners and chefs are important when analyzing the issues that are relevant for these audiences alongside their ideas on how to address them. Our results show that the current size of community garden plots and lack of technical knowledge plots limit the ability for gardeners to grow new crops. This suggests that because gardeners have a limited space to grow food, they are not willing to risk growing unfamiliar crops without any guidance or technical knowledge to do so. The main strategy highlighted by gardeners to address this issue was to incorporate access to technical resources and create more spaces where gardeners can talk to one another. They also pointed out that increasing gardening space would be ideal, but that was not the only option to increase gardening space for biodiverse food. Some gardeners suggested that their community garden only needed to designate communal plots “specifically for biodiverse options” in addition to individual plots to encourage gardeners to grow new crops. This idea may

create a trade-off because fewer people will have access to individual plots if there are more plots designated for biodiverse crops; however, it is an option that can be easily implemented in community gardens with less people. For chefs, developing interest in biodiverse food and cost effectiveness were their major barriers to increasing biodiverse options. It was repeatedly mentioned that it was economically and environmentally impracticable to have new biodiverse food options if students do not order them consistently. This suggests that students' purchasing behaviours need to shift towards more biodiverse food options for UBC Food Services to have a viable way of incorporating these options in campus food menus.

It was unexpected to see that marketing was one of the many overlapping themes in the strategies suggested by chefs and community gardeners (Figure 7). However, marketing is a common approach to incentivize consumers to buy and purchase unfamiliar products, especially when these products have attributes that are appealing to that audience (Roy et al., 2016). Since there was an overlap in motivation towards eating, cooking and growing new foods revolving around taste and nutritional value (Tables 2, 3 & 5), there is an opportunity to create marketing strategies that highlight the variety of flavours and health benefits of biodiverse foods. All of our recommendations to enhance campus biodiversity will also incorporate marketing approaches; however this will be discussed further in the Recommendations section of this report.

#### 4.5 DATA LIMITATIONS

As aforementioned, the posted Qualtrics survey received an optimal amount of responses from community gardeners and chefs. However, student responses were significantly poor, totalling up to 34 responses for the entirety of the survey duration. Despite our increased efforts to reach out to student groups living on campus through various social platforms such as UBC Residences Facebook, results from student groups were still overrepresented with students living off-campus.

In addition, only one out of three of the UBC First- Year Residences - Orchard Commons, were operating on campus during our research period. This limits the quantity of responses we obtained from students living in first-year residences, where three of the main UBC dining halls operate. Overall, our survey lacked representation from students living on campus and in first-year residences such as Orchard Commons, Place Vanier, and Totem

Park Residences. However, the low number of student survey recipients also provided in-depth responses to the open-ended question, which allowed us to accumulate worthy information for analysis.

## 5. RECOMMENDATIONS

### 5.1 RECOMMENDATIONS FOR ACTION AND IMPLEMENTATION

#### 5.1.1 ENHANCING CULINARY DIVERSITY

Many of our key findings illuminate the potential to shift cooking and eating preferences to support biodiversity. The first step UBC Food Services could take to enhance the diversity of their menu offerings is to create a ‘biodiversity-friendly food profile’: a comprehensive list of ingredients that have the potential to support campus biodiversity. We have begun to develop the profile in our enhancing biodiversity toolkit based on students’ knowledge and preferences identified in survey responses. In order to strengthen the food profile, we suggest UBC Food Services continues to identify ingredients that could enhance campus biodiversity if incorporated into their menus.

We envision the food profile as an internal document that can be used by chefs to encourage them to incorporate certain ingredients in campus meals. As a short-term goal, the food profile could ideally be completed in 3-6 months. When it expands, it could also be distributed to students and community gardeners. Community gardeners could use it to get ideas for new exciting crops to grow, and it could familiarize students with ingredients they may not know about or push them to eat more of the ones they do know of. For example, we found that the majority of students who answered our survey have heard about sprouted beans, spirulina/seaweed, jackfruit, ube, sorghum, amaranth, and moringa (see Appendix A, figure 9). We also found that students commonly said they’d like to see more vegan options, Asian and Indigenous foods served on campus. All of these inputs could be reflected in the contents of the food profile. The goal is to ultimately create an online resource of ingredients that can be utilized by chefs that are appropriate for both a diverse group of students and for campus biodiversity. We want to include lesser heard of crops, and highlight the importance of biodiversity in ecosystem services and agricultural resilience.

For chefs, we found that their top priority is to improve marketing strategies to reach students and get them to expand their diets. Long-term, we propose that a biodiversity marketing strategy is established to leverage students values and perceptions when it comes to eating diverse foods. It would revolve around a list of diversified ingredients developed by chefs in the food profile and advertisements that focus on promoting the health benefits and taste of certain foods. The visibility of these foods could be increased by setting up promotional booths (i.e., in the AMS Nest), distributing through faculty newsletters, and through partnerships with others working towards campus biodiversity.

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### 5.1.2 ENHANCING SEED AND FOOD GARDEN DIVERSITY

In order to enhance the diversity of seeds available to the UBC community, we propose that the Seeds Lending Library introduces a biodiversity program and accompanying outreach strategy to be implemented over the next few years. The program could involve diversifying seed inventory, hosting promotional workshops or creating videos to get people more involved. Some examples of topics that could be explored through workshops and videos are best practices for seed saving and starting seedlings. Another idea is to host a seed sharing festival where the community can come together and exchange their saved seeds among themselves. We envision this biodiversity program offering interactive experiences to bridge some of the knowledge gaps we have identified. First, there is a large gap in seed saving knowledge between beginner gardeners and experienced gardeners. Second, many of the people who have heard about the Seeds Lending Library have not used it. While this is inevitably due in part to the Library's closure over the course of the COVID-19 pandemic, the pandemic has also highlighted the need for low-barrier programs focused specifically on community resilience. Now is the time to start creating a biodiversity program that can foster resilience in campus food gardens and within the larger community of food producers on campus such as the UBC Farm.

The biodiversity program could be developed in collaboration with other campus entities such as the UBC Botanical Gardens, the UBC Farm, the Alma Mater Society (AMS) and the University Neighbourhoods Association (UNA) who organize campus community gardens. Collaborations would allow for various community gardeners, farmers, and seed inventories to share resources and strengthen partnerships in the movement towards

enhancing campus biodiversity. Based on the community gardeners' recommendations in the survey, unifying access to physical and educational resources seems to be a promising way to increase community participation and communication. Strengthening these networks will allow for increased seed saving and sharing on campus, which can support diverse crop planting and conserve genetic diversity for generations to come.

Another area of improvement that can be focused on in the long-term is allocating more resources to food crop producers and seed saving and sharing efforts at UBC. Our survey shows that the top three barriers community gardeners face to increasing the diversity of the food crops they grow is: 1) limited space and access to land; 2) lack of knowledge; and 3) lack of time. Comparatively, the willingness of gardeners to grow unfamiliar plants was ranked much lower as a barrier. Assuming peoples' willingness is not the problem, increasing funding and access to space appear to be crucial for enhancing food crop diversity.

Primary Stakeholders	Action Areas	Goal	Target	Length
UBC Food Services	Food profile	Create a Biodiversity-Friendly Food Profile	Create an accessible online resource of ingredients that are appropriate for a diverse group of students and campus biodiversity	Short-term
	Biodiversity marketing strategy	Encourage students to purchase diverse food	Increase awareness and demand for diverse dining purchases on campus	Mid-term
	Culinary diversity	Increased consumption of diverse food by students on campus	Double the number of culturally and nutritionally diverse menu items	Long-term
Seeds Lending Library	Biodiversity program	Create a biodiversity-focused seeds lending division	Increase the diversity of seeds available in the library	Mid-term
	Outreach strategy	Promote seeds lending library resources	Double the number of seeds library users (pre-COVID-19)	Mid-term
UBC Botanical Gardens, AMS, UNA, UBC Farm, Seeds Lending Library	Skill sharing	Reduce the gap between experienced and beginner gardeners	Facilitate workshop and events for community gardeners across campus	Short-term
	Food garden diversity	Enhance campus food biodiversity through strategic planting	Double the variety of edible plants grown on campus that are culturally and ecologically appropriate	Long-term

Table 6. Overview of recommendations for further action and research.



## 5.2 RECOMMENDATIONS FOR POLICY AND FUTURE RESEARCH

We have identified the need for two distinct long-term goals: 1) to double the number of culturally and nutritionally diverse menu items on campus; and 2) to double the variety of edible plants grown on campus that are culturally and ecologically appropriate. We recommend that the goal for culinary diversity (1) is reflected in the UBC Food Service Procurement Guidelines as a commitment for the next 10-15 years. This goal seeks to represent the community present on campus in the diversity of food options available, all while taking action on the state of climate emergency declared by UBC in 2019. We also recommend that the goal for food garden diversity (2) is supported by UBC's upcoming Climate Action Plan 2030 (CAP 2030). In CAP 2030, campus biodiversity needs to be recognized as an important component of social and ecological sustainability. Increasing funding and access to space for a variety of garden diverse projects through CAP 2030 can support food systems sustainability and community resilience.

To work towards these goals, more research needs to be done to assess levels of culinary and food garden diversity. Monitoring and evaluation efforts would be needed in order to ensure that these goals are on track, and could likely be evaluated in the larger scope of food systems sustainability. To support these goals, continued research could be done into which local ingredients are promising to grow and cook, taking into account nutritional value, taste, and ecological sustainability of production. Creating and strengthening links to local producers, farms, and related organizations can also be a useful tool in working towards the goal for culinary diversity.

## 6. CONCLUSION

As presented in our results, campus food biodiversity is a holistic definition which embraces the perspectives of the UBC community towards the campus food system. While every individual on campus may contribute to or be influenced by the outcomes of campus food biodiversity, our research has targeted the main three groups that are directly associated with the food production, food preparation and food consumption processes of the UBC food system, namely the community gardeners, chefs and students respectively.

By merging the outcomes of our data analysis with literature review from previous studies (Ng *et al.*,

2018; Zeng *et al.*, 2019; Lin *et al.*, 2020) which targets the UBC food system, a definition for campus food biodiversity was proposed for the purposes of future projects involving food diversity, biodiversity, and campus community. Within UBC, our survey analysis provided thoughtful insights into the knowledge gap found between novice and veteran gardeners, the motivation to increase food diversity in different targeted groups, the relevant barriers and strategies to enhance campus food biodiversity.

Following our analysis, we proposed a list of tangible action-based recommendations for our respective stakeholders outlining the action areas, goals, target, and estimated implementation period. Equipped with an abundance of food system resources, UBC provides a conducive environment for our team to lead the creation of a Food Systems Biodiversity Engagement Toolkit (FSBET) by incorporating our research findings. A biodiverse-friendly food system is the epitome of campus wellbeing. Therefore, we believe that the implementation of FSBET in time, along with future research in the context of campus food biodiversity, will significantly enhance the sustainability of the UBC food system.

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## APPENDICES

## APPENDIX A: ADDITIONAL FIGURES

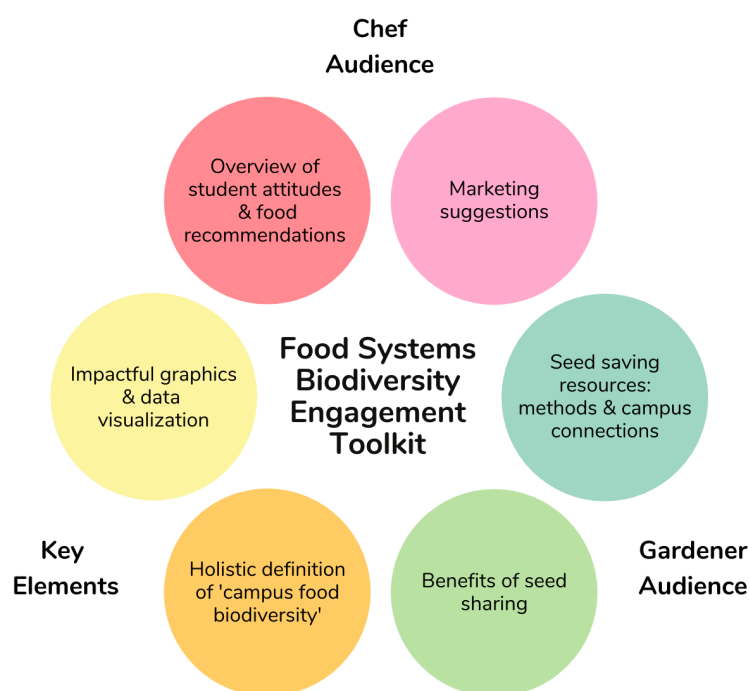


Figure 8. Food Systems Biodiversity Engagement Toolkit (FSBET) Overview. The toolkit is currently in progress. FSBET will be in the form of a PDF document.

Ingredient	Count	Percentage of students (%)
Sprouted beans	29	100.00
Jackfruit	28	96.55
Spirulina (algae)/ seaweed (wakame)	28	96.55
Ube (purple yam)	25	86.21
Sorghum	18	62.07
Moringa	16	55.17
Amaranth	16	55.17
Cow peas	13	44.83
Bambara beans	3	10.34
Salsify	1	3.45
None of the following	0	0.00
Fonio	0	0.00

Table 7. Students' survey responses to question 5: "Have you heard of any of the following fruits, vegetables, and/or grains? Check all that apply." The majority of students who answered said they have heard of sprouted beans, jackfruit, spirulina/seaweed, ube, sorghum, moringa, and amaranth.

Codes	Students	Students (%)
Arab foods	1	3.13
Comfort foods	1	3.13
Indian foods	1	3.13
Lack of African cuisine options	1	3.13
More affordable organic options	1	3.13
More protein sources	1	3.13
New and more diverse grains	1	3.13
Persian foods	1	3.13
Traditional European foods	1	3.13
Caribbean foods	2	6.25
Deterrent from eating on campus	2	6.25
Meat alternatives	2	6.25
Mediterranean food	2	6.25
11 : Middle Eastern foods	2	6.25
14 : More tubers	2	6.25
20 : Plant based foods	2	6.25
7 : Indigenous foods	3	9.38
15 : More variety of foods	3	9.38
16 : More vegan options	4	12.50
2 : Asian foods	5	15.63
18 : No opinion	15	46.88
<b>Total responses</b>	<b>32</b>	

Table 8. Responses to question 10 in the student survey, “Are there any meals or ingredients that you would like to see being served on campus?”.

APPENDIX B: DATA COLLECTION TOOLS

B.1 QUESTIONNAIRE COVER LETTER AND INFORMED CONSENT FORM

THE UNIVERSITY OF BRITISH COLUMBIA



**Liska Richer**  
**Faculty of Land and Food Systems**  
221-2357 Main Mall  
Vancouver, BC, Canada V6T 1Z4

Tel: 604-822-3270  
Email: [liska.richer@ubc.ca](mailto:liska.richer@ubc.ca)

**Class Project: The Campus Food System Sustainability Initiative**  
**QUESTIONNAIRE COVER LETTER and INFORMED CONSENT**

**STUDY TEAM: *Who is conducting the study?***

**Principal Investigator:**

Liska Richer, Instructor, Land and Food Systems 450 class, Faculty of Land and Food Systems  
E-mail: [liska.richer@ubc.ca](mailto:liska.richer@ubc.ca)  
Tel: 604.822.3270

**INVITATION AND STUDY PURPOSE**

You are being invited to take part in this research study because you are affiliated with the UBC food system. We want to learn more about the sustainability of the campus of the food system. This study will help us advance our knowledge and learn more about ways to enhance the sustainability of the campus food system.

**STUDY PROCEDURES: How is the study done?**

This study is being carried out by students within their course on “Land, Food and Community III” (LFS 450) in the Faculty of Land and Food Systems. If you agree to participate, you are being asked to participate in an online or telephone interview, online or telephone focus group, or electronic questionnaire, and your time commitment will vary depending on which one you are participating in. It is estimated that your time commitment will range from 5 minutes to 1 hour. You will be given either a electronic form to answer or be asked verbally a set a questions via online methods. For online interviews or focus groups, you will be sent a link to a Zoom meeting. Please log in using a nickname or a substitute name or research code which will be given ahead of time by the research team. You can participate with your camera on or off, and can mute your microphone (if cases where it is not needed).

**STUDY RESULTS**

The results of this study will be reported in course based undergraduate reports and will be published in the SEEDS Sustainability Library and UBC cIRcle Digital repository.



## THE UNIVERSITY OF BRITISH COLUMBIA

### POTENTIAL RISKS OF THE STUDY

We do not think there is anything in this study that could harm you or be bad for you. Some of the questions we ask might upset you or seem sensitive or personal. Please let one of the study staff know if you have any concerns. You do not have to answer any question if you do not want to.

### POTENTIAL BENEFITS OF THE STUDY

You may be helped in this study by findings contributing to the advancement of a more ecological, economic and social sustainable food system. In the future, others may benefit from what we learn in this study.

### CONFIDENTIALITY

Your answers will remain anonymous unless you provide written permission (below) to the UBC student conducting the interview or survey, to disclose your name, working position or any other information revealing your identity in any possible future use of the information you provide. If you are participating in a focus group, please note that only limited confidentiality can be offered and we encourage participants not to discuss the content of the focus group to people outside the group; however, we can't control what participants do with the information discussed. All documents will be identified only by code number and kept in a locked filing cabinet. Subjects will not be identified by name in any reports of the completed study.

### PAYMENT

We will not pay you for the time you take to be in this study.

### PARTICIPANT CONSENT AND SIGNATURE PAGE

Taking part in this study is entirely up to you. You have the right to refuse to participate in this study. If you decide to take part, you may choose to pull out of the study at any time without giving a reason and without any negative impact on your employment, or class standing.

***If the questionnaire is completed, it will be assumed that consent has been given to participate in this study.***

### CONTACT FOR INFORMATION ABOUT THE STUDY

If you have any questions or concerns about what we are asking of you, please contact the Principal Investigator and Course Instructor. The names and telephone numbers are listed at the top of the first page of this form.

## THE UNIVERSITY OF BRITISH COLUMBIA

### **CONTACT FOR COMPLAINTS:**

Who can you contact if you have complaints or concerns about the study?

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail [RSIL@ors.ubc.ca](mailto:RSIL@ors.ubc.ca) or call toll free 1-877-822-8598



Liska Richer  
Principal Investigator  
January, 2021

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## B.2 STUDENT QUALTRICS SURVEY

# Student Survey: Enhancing Biodiversity on Campus

### Start of Block: Students Survey

#### Welcome UBC Students! Allow us to tell you a little about this project...

If the questionnaire is completed, it will be assumed that consent has been given to participate in this study. For more information on consent please see this form: [questionnaire consent form](#).

As part of our research, we will analyze survey responses to develop a unifying definition of 'campus food biodiversity' and to develop a toolkit. If you are interested, you can enter your email at the end of the survey to win a \$25 gift card OR a 'seed care package' to grow your own crops.

The term “biodiversity” is often associated with the variety of species and living organisms in our ecosystem. However, biodiversity is present in other aspects of our lives that are important to us, including what we eat. As part of our LFS 450 community- based project our goal is to assess and uncover the existing knowledge about “food biodiversity” on campus. In order to do so, we are asking UBC members such as students, culinary staff, and community gardeners to participate in this survey.

This survey aims to understand student perceptions and attitudes towards the diversity of food served at UBC Food Services locations. In an effort to increase biodiversity within UBC’s food system, we’d like to hear your experiences on the diversity of choices available to you, and the diversity of your current eating habits at UBC Food Service locations. We also want to know what gets you excited to try new foods, and what makes you choose to keep incorporating those foods into your diet. Your responses will help shape the future of food diversity at UBC Food Services.

#### Survey Details:

The estimated time to complete this survey is between 10 - 15 minutes.

The survey will have 2 parts:

Part 1: General Questions

Part 2: Audience Specific Questions

The last few questions of Part 2 will be discussion type of questions where you will have the opportunity to share your perspectives on what 'campus biodiversity' means to you.

Part 1: General Questions

1. Please select your age range :

Under 18 years (1)

18 - 24 years (2)

- 25 - 34 years (3)
- 35 - 44 years (4)
- 45 - 54 years (5)
- 55 years or older (6)
- Prefer not to answer (7)

2. What is your gender identity?

- Male (1)
- Female (2)
- Non-binary (3)
- Prefer to not answer (4)

3. Do you self-identify as an Aboriginal person? For the purposes of this survey, an “Aboriginal person” includes persons who are First Nations, Metis, or Inuit.

- Yes (1)
- No (2)
- Prefer to not answer (3)

4. Do you self-identify as a “visible minority”? According to the Employment Equity Act, members of “visible minorities” are a designated group. At UBC, we define this term as “persons (other than Aboriginal persons, defined above), who self-identify as “people of colour”. Members of visible minority groups include both persons who were born in Canada or other countries.

- Yes (1)
- No (2)

Prefer to not answer (3)

*Display This Question:*

*If 4. Do you self-identify as a "visible minority"? According to the Employment Equity Act, members... , Yes Is Displayed*

5. OPTIONAL. If you answer "yes" to the previous question, please indicate how you self-identify.

Black (1)

Non-white Latin American (including Indigenous persons from Central and South America) (2)

East Asian (e.g., Chinese, Japanese, Korean, Polynesian) (3)

South Asian/ Indo-Pakistani (e.g., Indian, Pakistani, Sri Lankan, etc) (4)

Southeast Asian (e.g., Cambodian, Filipino, Laotian, Vietnamese, etc) (5)

Other - Please Specify (6) \_\_\_\_\_

6. Where do you personally buy/source your food? \*Rank 1-5 based on most visited (1 - most visited, 5 - least visited).

\_\_\_\_\_ Farmers Market (at UBC or other locations) (1)

\_\_\_\_\_ Corporate Grocers (e.g., Save on Foods, Safeway, etc) (2)

\_\_\_\_\_ Local Green Grocers (e.g., Kin's Market, Persia Foods, etc) (3)

\_\_\_\_\_ Discount Grocery Store (e.g., No Frills) (4)

\_\_\_\_\_ Other - Please Specify (5)

7. Which year of your undergraduate degree are you currently in?

First year (1)

Second year (2)

Third year (3)

Fourth year (4)

Fifth year + (5)

I'm a graduate student (6)

8. Do you currently live in UBC Student Residence Housing? If yes, please specify which one.

Yes (1) \_\_\_\_\_

No (2)

End of Block: Students Survey

Start of Block: The following questions relate to your attitudes towards trying new foods at UBC

Part 2: Audience Specific Questions

1. Do you have any dietary restrictions? If yes, can you specify which?

Yes (1) \_\_\_\_\_

No (2)

2. Do you have any accessibility needs?

Yes (1)

No (2)

For question 3: consider the following definition. For purposes of this survey, *food diversity* is the variety of non-animal food sources such as nuts, fruits, vegetables, and grains that are available for consumption.

3. Do you think that UBC food services serve a diverse selection of foods? *\*Background - UBC Food services locations include: Bento Sushi, Harvest Market, Mercante, Hero Coffee and Market, SAGE restaurant and catering, Scholar's catering, The POINT, Orchard Commons Open Kitchen, Totem Park Dining Hall, Place Vanier Gather Kitchen*

Yes (1)

- No (2)
- I have not dined at UBC Food Services locations (3)

For question 4: consider the following definition. For purposes of this survey, food diversity is the variety of non-animal food sources such as nuts, fruits, vegetables, and grains that are available for consumption.

4. Since attending UBC, has the overall diversity of food you eat increased, decreased or stayed the same?

- Increased (1)
- Decreased (2)
- Stayed the same (3)
- I have not dined in at UBC Food Services locations (4)

5. Have you heard of any of the following fruits, vegetables, and/or grains? Check all that apply.

- a. None of the following (1)
- b. Bambara beans (2)
- c. Moringa (3)
- d. Cow peas (4)
- e. Sprouted beans (5)
- f. Ube (purple yam) (6)
- g. Salsify (7)
- h. Jackfruit (8)

i. Spirulina (algae)/ seaweed (wakame) (9)

j. Fonio (10)

k. Amaranth (11)

l. Sorghum (12)

6. What makes you step out of your “comfort” zone and try a new dish prepared with less common ingredients/vegetables (i.e., crops which are not found in typical corporate grocery stores or crops which are culturally significant but are less known)?

*\*Rank 1-9 based on your top preferences, 1- most agreed, 9 - least agreed).*

- \_\_\_\_\_ Free tastings (1)
- \_\_\_\_\_ Attractive menu display (2)
- \_\_\_\_\_ Attractive “appeal” or “look” (particularly when seeing it) (3)
- \_\_\_\_\_ Like to try new foods (4)
- \_\_\_\_\_ Meal Kit plans such as Hellofresh, Goodfood etc (5)
- \_\_\_\_\_ Promotional item on the menu (6)
- \_\_\_\_\_ Friends or family member recommendation (7)
- \_\_\_\_\_ Social media trend (pictures or videos) (8)
- \_\_\_\_\_ Other\_\_\_\_\_ (9)

7. What would make you more likely to continue eating these new dishes?

*\*Rank 1-10 based on your top preferences, 1- most agreed, 10 - least agreed).*

- \_\_\_\_\_ Taste (1)
- \_\_\_\_\_ Price (2)
- \_\_\_\_\_ Nutritional value (3)
- \_\_\_\_\_ Proximity to food source (4)
- \_\_\_\_\_ Ease of cooking it at home (replicating dish) (5)
- \_\_\_\_\_ Convenience of food premises’ operating hours (6)
- \_\_\_\_\_ Ingredients were locally sourced (BC or Canada) (7)
- \_\_\_\_\_ Ingredients were grown organically (8)
- \_\_\_\_\_ Ingredients were grown using sustainable agricultural practices (i.e. not from monocultures) (9)
- \_\_\_\_\_ Other: \_\_\_\_\_ (10)

8. Would you be interested in eating fruits, vegetables, grains, etc that you have not tried before, if it was served on campus?



Yes, a greater variety is better (1)

No, I prefer familiarity (2)

9. Have you heard of the UBC Seed Lending Library on campus?

Yes, I have used it many times (1)

Yes, I have used it once or twice (2)

Yes, but I have never used it (3)

No (4)

The following questions are discussion questions. We would like to hear more about your experience in finer detail. Please use your own words. If our survey did not include anything you think is important, please use this section to tell us.

10. Are there any meals or ingredients that you would like to see being served on campus?

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---

11. As a student, what does campus biodiversity mean to you?

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Thank you for taking the time to participate in this survey. Your contribution helps us shape the future of food biodiversity on campus! After this, there will be a link to enter a draw to win a gift card OR seed care package OR a hot pepper plant.

**End of Block: The following questions relate to your attitudes towards trying new foods at UBC**

Thank you for your time spent taking this survey. Your response has been recorded.

To enter the draw to win a gift card OR seed care package, please click here:

[https://ubc.ca1.qualtrics.com/jfe/form/SV\\_4ONcJp0jsLG8fbw](https://ubc.ca1.qualtrics.com/jfe/form/SV_4ONcJp0jsLG8fbw)

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### B.3 CHEF QUALTRICS SURVEY

## UBC Kitchen Staff Survey: Enhancing Biodiversity on Campus

#### Start of Block: Default Question Block

**Hello UBC Kitchen Staff!** If the questionnaire is completed, it will be assumed that consent has been given to participate in this study. For more information on consent, please see this [form](#).

As part of our research, we will analyze survey responses to develop a unifying definition of 'campus food biodiversity' and to develop a toolkit. If you are interested, you can enter your email at the end of the survey to win a \$25 gift card OR a 'seed care package' to grow your own crops.

The term “biodiversity” is often associated with the variety of species and living organisms in our ecosystem. However, biodiversity is present in other aspects of our lives that are important to us, including what we eat. As part of our LFS 450 community- based project our goal is to assess and uncover the existing knowledge about “food biodiversity” on campus. In order to do so, we are asking UBC members such as students, culinary staff, and community gardeners to participate in this survey. We use the information received from the surveys to define the term “food biodiversity” on campus and further develop a comprehensive toolkit that will provide access to practical and educational sources for enhancing campus biodiversity in food garden production and culinary practices. As chefs and culinary staff, we want to understand your motivation behind cooking a diverse range of foods, in addition to your experiences with cuisine and how this affects food biodiversity at UBC.

#### Survey Details:

The estimated time to complete the survey is between 10 - 15 minutes.

The survey will have 2 parts:

Part 1: General Questions

Part 2: Audience Specific Questions (this depends on whether you are a student, UBC kitchen staff, or community gardener)

The last few questions of Part 2 will be discussion type of questions where you will have the opportunity to share your perspectives on what 'campus biodiversity' means to you.

#### Part 1: General Questions

1. Please select your age range:

- Under 18 years (1)
- 18 - 24 years (2)
- 25 - 34 years (3)

- 35 - 44 years (4)
- 45 - 54 years (5)
- 55 years or older (6)
- Prefer to not answer (7)

2. What is your gender identity?

- Male (1)
- Female (2)
- Non-binary (3)
- Prefer to not answer (4)

3. Do you self-identify as an Aboriginal person? For the purposes of this survey, an “Aboriginal person” includes persons who are First Nations, Metis, or Inuit.

- Yes (1)
- No (2)
- Prefer to not answer (3)

4. Do you self-identify as a “visible minority”? According to the Employment Equity Act, members of “visible minorities” are a designated group. At UBC, we define this term as “persons (other than Aboriginal persons, defined above), who self-identify as “people of colour”. Members of visible minority groups include both persons who were born in Canada or other countries.

- Yes (1)
- No (2)

Prefer to not answer (3)

5. OPTIONAL. If you answer “yes” to the previous question, please indicate how you self-identify.

Black (1)

Non-white Latin American (including Indigenous persons from Central and South America) (2)

East Asian (e.g., Chinese, Japanese, Korean, Polynesian) (3)

South Asian/ Indo-Pakistani (e.g., Indian, Pakistani, Sri Lankan, etc) (4)

Southeast Asian (e.g., Cambodian, Filipino, Laotian, Vietnamese, etc) (5)

West Asian/ Arab (e.g., Afghan, Iranian, etc) (6)

Persons of Mixed Origin (e.g., with one parent in one of the visible minority groups listed above) (7)

Other - Please Specify (8) \_\_\_\_\_

6. Where do you personally buy/source your food? \*Rank 1-5 based on most visited (1 - most visited, 5 - least visited).

\_\_\_\_\_ Farmers Market (at UBC or other locations) (1)

\_\_\_\_\_ Corporate Grocers (e.g., Save on Foods, Safeway, etc) (2)

\_\_\_\_\_ Local Green Grocers (e.g., Kin's Market, Persia Foods, etc) (3)

\_\_\_\_\_ Discount Grocery Store (e.g., No Frills) (4)

\_\_\_\_\_ Other - Please Specify (5)

End of Block: Default Question Block

Start of Block: Block 1

## Part 2: UBC Kitchen Staff Questions

1. How long have you worked with UBC Food Services?

Less than a year (1)

1 - 2 years (2)

3 - 5 years (3)

6 - 10 years (4)

10+ years (5)

2. Which kitchen do you currently work at?

---

3. What is your position?

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For question 4: consider the following definition. For purposes of this survey, food diversity is the variety of non-animal food sources such as nuts, fruits, vegetables, and grains that are available for consumption.

4. Do you think that UBC Food Services serve a diverse selection of foods?

Yes (1)

No (2)

For question 5: consider the following definition. For purposes of this survey, food diversity is the variety of non-animal food sources such as nuts, fruits, vegetables, and grains that are available for consumption.

5. In the last 2 years, have you noticed more demand or incentive to provide a more diverse selection of food?

Yes (1)

No (2)

I don't know (3)

*Display This Question:*

*If For question 5: consider the following definition. For purposes of this survey, food diversity is... = Yes*

6. If you have noticed more demand or incentive to provide a more diverse selection of food, who is advocating for this change? \*Rank from 1-7 based on most applicable to least applicable, 1- most applicable, 7 - least applicable.

- \_\_\_\_\_ Students (1)
- \_\_\_\_\_ UBC (2)
- \_\_\_\_\_ UBC Food Services Direction and Management (3)
- \_\_\_\_\_ Local Suppliers (4)
- \_\_\_\_\_ Organic Suppliers (5)
- \_\_\_\_\_ National Wholesale Food Suppliers (6)
- \_\_\_\_\_ Other - Please Specify (7)

7. In your UBC kitchen, what motivates you to try new recipes with less common ingredients? \*Rank from 1-9 based on most applicable to least applicable, 1- most applicable, 9- least applicable.

- \_\_\_\_\_ UBC Food Services 'Food Vision and Values' guidelines (1)
- \_\_\_\_\_ When given the opportunity to create "the special" of the day (2)
- \_\_\_\_\_ Bring more creativity/meaning into dishes (3)
- \_\_\_\_\_ Access to seasonally available produce (4)
- \_\_\_\_\_ Inspiration from other chefs in your kitchen (5)
- \_\_\_\_\_ Inspiration from other chefs online (6)
- \_\_\_\_\_ Inspiration from other dishes you've tried (7)
- \_\_\_\_\_ I haven't had the opportunity to create new recipes (8)
- \_\_\_\_\_ Other - Please Specify (9)

8. During your creative process of creating a dish, what do you focus on the most?

- Developing new technique on ingredients I'm used to cooking with (1)
- Cooking with different ingredients/vegetables using the techniques I know (2)
- Cooking with different ingredients/vegetables and using new techniques (3)
- I haven't had the opportunity to create new recipes (4)
- Other- Please Specify (5) \_\_\_\_\_

9. Do you think about biodiversity when cooking/creating a recipe?

- Yes (1)

No (2)

Sometimes (3)

10. Have you heard of the UBC Seed Lending Library on campus?

Yes, I have used it many times (1)

Yes, I have used it once or twice (2)

Yes, but I have never used it (3)

No (4)

The following questions are discussion questions. We would like to hear more about your experience in finer detail. Please use your own words. If our survey did not include anything you think is important, please use this section to tell us.

11. As a chef/cook, what does campus biodiversity mean to you?

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12. What is the main barrier to increasing the diversity of food served by UBC Food Services?

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13. Do you have any recommendations on how to improve the diversity of food served by UBC Food Services?

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**End of Block: Block 1**

Thank you for your time spent taking this survey. Your response has been recorded.

To enter the draw to win a gift card OR seed care package, please click here:

[https://ubc.ca1.qualtrics.com/jfe/form/SV\\_4ONcJp0jsLG8fbw](https://ubc.ca1.qualtrics.com/jfe/form/SV_4ONcJp0jsLG8fbw)

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B.4 COMMUNITY GARDENER QUALTRICS SURVEY

## Community Gardeners Survey: Enhancing Biodiversity on Campus

### Start of Block: Block 1

Welcome UBC Community Gardeners! Allow us to tell you a little about this project...

If the questionnaire is completed, it will be assumed that consent has been given to participate in this study. For more information on consent please see this form: [questionnaire cover letter consent form](#).

As part of our research, we will analyze survey responses to develop a unifying definition of 'campus food biodiversity' and to develop a toolkit. If you are interested, you can enter your email at the end of the survey for a chance to win a \$25 gift card OR a seed care package to grow your own crops. The term "biodiversity" is often associated with the variety of species and living organisms in our ecosystem. However, biodiversity is present in other aspects of our lives that are important to us, including what we eat. As part of our LFS 450 community-based project our goal is to assess and uncover the existing knowledge about "food biodiversity" on campus. In order to do so, we are asking UBC members such as students, culinary staff, and community gardeners to participate in this survey.

We use the information received from the surveys to define the term "food biodiversity" on campus and further develop a comprehensive toolkit that will provide access to practical and educational sources for enhancing campus biodiversity in food garden production and culinary practices.

This survey aims to understand community gardeners' perceptions and attitudes towards the diversity of edible plants on campus. In an effort to increase biodiversity in UBC's food system, we'd like to hear all your experiences relevant to conserving seed diversity in community gardening. We also want to know the motivations and setbacks faced during your gardening-related endeavours. Your responses will support the creation of a toolkit to help shape the future of food biodiversity at UBC.

#### Survey details:

The estimated time to complete the survey is between 10 - 15 minutes.

The survey will have 2 parts:

Part 1: General Questions

Part 2: Audience Specific Questions (depending on if you are a student, community gardener, or UBC kitchen staff)

The last few questions of Part 2 will be discussion type questions where you will have the opportunity to share your perspectives on the meaning of 'campus biodiversity' to you.

### End of Block: Block 1

### Start of Block: Block 2



Part 1: General Questions

1. Please select your age range

- Under 18 years (1)
- 18-24 years (2)
- 25-34 years (3)
- 35-44 years (4)
- 45-54 years (5)
- 55 years or older (6)
- Prefer not to answer (7)

2. What is your gender identity?

- Male (1)
- Female (2)
- Non-binary (3)
- Prefer not to answer (4)

3. Do you self-identify as an Aboriginal person? For the purposes of this survey, an “Aboriginal person” includes persons who are First Nations, Metis, or Inuit.

- Yes (1)
- No (2)
- Prefer not to answer (3)

4. Do you self-identify as a “visible minority”? According to the Employment Equity Act, members of “visible minorities” are a designated group. At UBC, we define this term as “persons (other than Aboriginal persons, defined above), who self-identify as “people of colour”. Members of visible minority groups include both persons who were born in Canada or other countries.

- Yes (1)
- No (2)
- Prefer not to answer (3)

*Display This Question:*

*If 4. Do you self-identify as a “visible minority”? According to the Employment Equity Act, members... = Yes*

5. OPTIONAL. If you answer “yes” to the previous question, please indicate how you self-identify.

- Black (1)
- Non-white Latin American (including Indigenous persons from Central and South America) (2)
- East Asian (e.g., Chinese, Japanese, Korean, Polynesian) (3)
- South Asian/Indo-Pakistani (e.g., Indian, Pakistani, Sri Lankan, etc.) (4)
- Southeast Asian (e.g., Cambodian, Filipino, Laotian, Vietnamese, etc.) (5)
- West Asian/Arab (e.g., Afghan, Iranian, etc.) (6)
- Persons of Mixed Origin (e.g., with one parent in one of the visible minority groups listed above) (7)
- Other - please specify: (8) \_\_\_\_\_

6. Where do you source/buy your food? \*Rank 1-5 based on the most visited, (1 - most visited, 5 - least visited).

- \_\_\_\_\_ Farmers market (at UBC or other locations) (1)
- \_\_\_\_\_ Corporate grocers (e.g., Save on Foods, Safeway) (2)
- \_\_\_\_\_ Local green grocers (e.g., Kin's market, Persia Foods) (3)
- \_\_\_\_\_ Discount grocery stores (e.g., No Frills) (4)

\_\_\_\_\_ Other: (5)

End of Block: Block 2

Start of Block: Default Question Block

## Part 2: Community Gardener Questions

1. How long have you been gardening for?

- Less than a year (1)
- 1-2 years (2)
- 3-6 years (3)
- 7-10 years (4)
- 11+ years (5)

2. Which UBC community garden are you associated with ?

- Garden name: (1) \_\_\_\_\_
- Location: (2) \_\_\_\_\_

3. What is your role at your community garden?

- Volunteer (1)
- Coordinator (2)
- Executive team member (3)
- I have my own plot (4)

Other: (5) \_\_\_\_\_

4. Have you participated in any seed sharing or seed exchange events?

Yes (1)

No (2)

5. Have you heard of the UBC Seeds Lending Library?

Yes, I have used it many times (1)

Yes, I have used it once or twice (2)

Yes, but I have never used it (3)

No (4)

6. Do you have experience in seed saving? Choose the option that best fits your experience.

Yes, I consistently save seeds and use them (1)

Yes, I have successfully saved and used my seeds (2)

Yes, I have tried saving seeds but was unsuccessful (3)

No, but I am interested in trying (4)

No, I don't know what seed saving is (5)

No, I don't want to try seed saving (6)

7. Have you shared or exchanged the seeds you saved with anyone else? Check all that apply.

Yes, I have shared my seeds with my fellow community gardeners (1)

- Yes, I have shared my seeds with neighbouring gardens (2)
- Yes, I have shared my seeds with friends or family (3)
- Yes, I have shared my seeds using the Seeds Lending Library at UBC (4)
- No, I keep the saved seeds for personal use only (5)
- I have not saved seeds (6)

8. Where do you get your seeds and/or seedlings? Check all that apply.

- Direct from a seed supplier (1)
- UBC Botanical Garden (2)
- Garden centres (3)
- Grocery or retail stores (4)
- Nurseries (5)
- Seed saving (6)
- Seed sharing from other gardeners (7)
- UBC Farm (8)
- UBC Seeds Lending Library (9)
- A seed bank or seed library off-campus (10)
- Other: (11) \_\_\_\_\_

9. What are the most important factors you consider when deciding where to source your seeds? \*Rank from 1-8 based on most applicable to least applicable, 1- most applicable, 8 - least applicable.

- \_\_\_\_\_ Cost of seeds (1)
- \_\_\_\_\_ Familiarity of varieties (2)
- \_\_\_\_\_ Convenient pick-up location (3)
- \_\_\_\_\_ Supplier offers shipping (4)
- \_\_\_\_\_ Quality of seeds (5)
- \_\_\_\_\_ Selection of seed varieties (6)
- \_\_\_\_\_ Relationships with providers (7)
- \_\_\_\_\_ Other: (8)

10. What is your motivation for growing different species in your garden? \*Rank from 1-10 based on most applicable to least applicable, 1- most applicable, 10 - least applicable.

- \_\_\_\_\_ Cooking and eating preferences (1)
- \_\_\_\_\_ Nutritional value (2)
- \_\_\_\_\_ Discovering new flavours (3)
- \_\_\_\_\_ Supporting pollinators (4)
- \_\_\_\_\_ Soil health and maintenance (5)
- \_\_\_\_\_ Companion planting (6)
- \_\_\_\_\_ Pest management (7)
- \_\_\_\_\_ Maintaining heritage varieties (8)
- \_\_\_\_\_ Aesthetic value (9)
- \_\_\_\_\_ Other: (10)

11. Approximately how many crop varieties did you grow last season? Please consider all the different varieties of each species you grew (e.g. roma tomatoes vs beefsteak tomatoes).

- 0-9 (1)
- 10-19 (2)
- 20-29 (3)
- 30-39 (4)
- 40-49 (5)
- 50+ (6)

12. What limits the overall diversity of crops you grow? \*Rank from 1-7 based on most applicable to least applicable, 1- most applicable, 7 - most applicable.

- \_\_\_\_\_ The amount of growing space I have access to (1)
- \_\_\_\_\_ The amount of financial resources I have access to (2)
- \_\_\_\_\_ I don't know where to get more diverse seeds (3)
- \_\_\_\_\_ I don't know how to grow many species or varieties (4)
- \_\_\_\_\_ I like growing crops I'm familiar with (5)
- \_\_\_\_\_ I don't feel the need to grow different species or varieties (6)
- \_\_\_\_\_ Other: (7)

The following questions are long answer questions. We want to hear about your experience in more detail, in your own words. If there's anything we didn't fully capture in our survey questions, now is your chance to tell us about it!

13. As a gardener, what does campus biodiversity mean to you?

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14. What is the main barrier to increasing the diversity of food crops grown in your community garden?

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15. Do you have any recommendations on how to improve the diversity of food crops grown in your community garden?

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End of Block: Default Question Block

Thank you for your time spent taking this survey. Your response has been recorded.

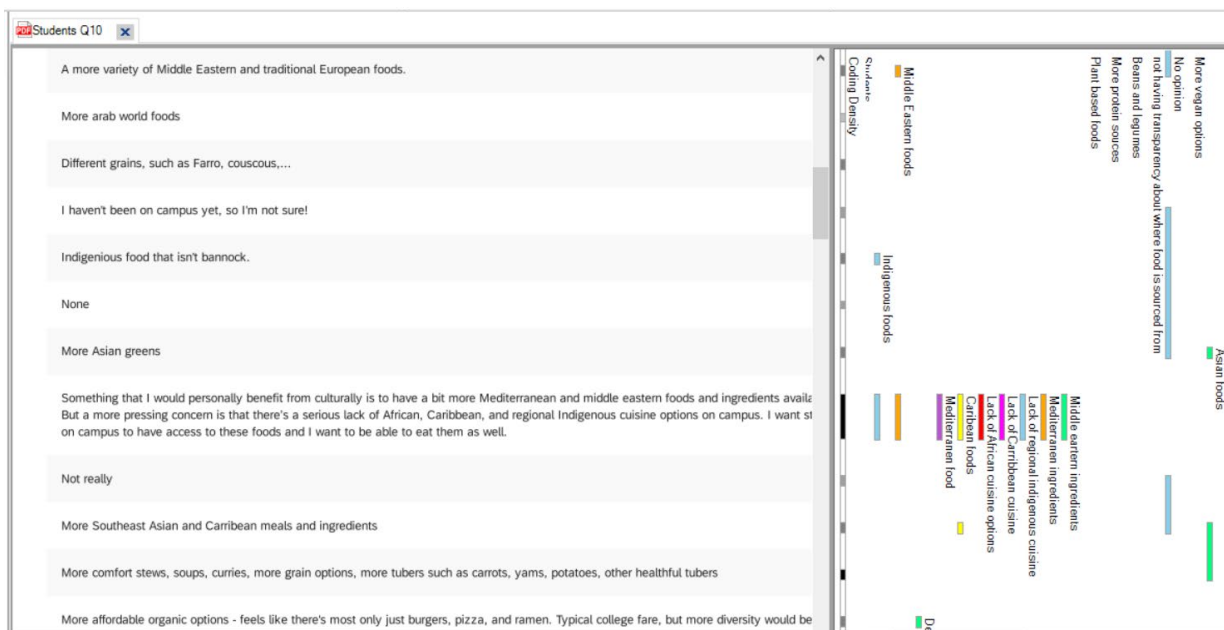
To enter the draw to win a gift card OR seed care package, please click here:

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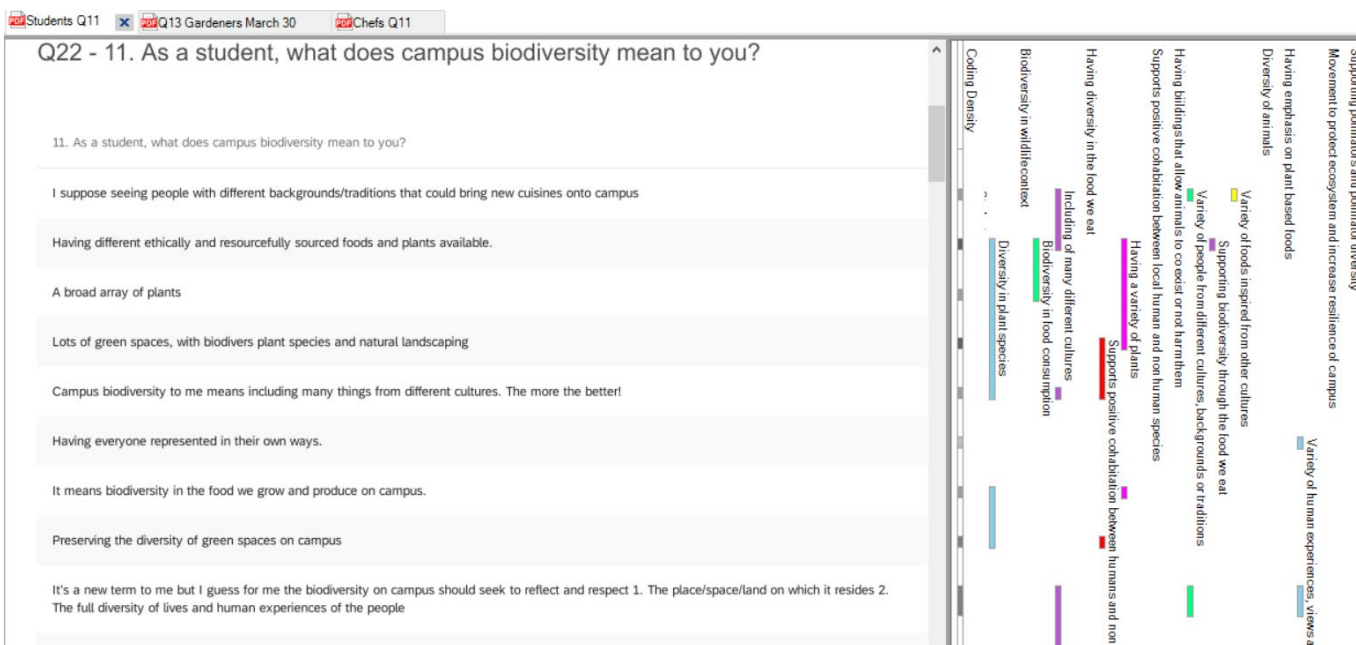
## APPENDIX C: DATA ANALYSIS PROCESS WORK

### Coding process

Question: "Are there any meals or ingredients that you would like to see being served on campus?" Note: This is not the complete data set.



Questions: “As a student, what does campus biodiversity mean to you?” Note: This is not the complete data set.



Questions: “As a gardener, what does campus biodiversity mean to you?” Note: This is not the complete data set.



Students Q11 Q13 Gardeners March 30 Chefs Q11

### Q20 - 13. As a gardener, what does campus biodiversity mean to you?

13. As a gardener, what does campus biodiversity mean to you?

Creating natural habitats on campus for flora and fauna to support our pollinators, birds, etc. Using natural systems to create habitats.

Doing our small part to break the reliance on industrial agriculture

It means growing a variety of plants to promote pollinators and other life (birds and animals) to thrive in a closed system. It means growing plants that are native or that have been bred to thrive in the Pacific NW.

I value greatly campus biodiversity and am also concerned about the expansion of invasive species such as Scotch Bloom, Himalayan Blackberry and English Holly (as well as English Ivy but less with that species). A system with higher biodiversity can sustain more species and is more resilient to disturbance or even climate change. The campus biodiversity will of course influence the biodiversity of the greater neighbourhood including Pacific Spirit Regional Park and further out. I am in full support of campus diversity and value it greatly.

N/A

Campus biodiversity means the different types (species/varieties) of plants that there are on campus.

Good soil, variety of species, integration of diverse spaces

**Coding Density**

- Examples
  - Diversity of local species
  - Diversity of native species
  - Growing plants that have been bred to thrive in the Pacific NW.
- Support
  - Support
- Diversity of birds
- Supporting pollinators and pollinator diversity
- Campus biodiversity will also influence the biodiversity
- Concerns about invasive species
- Creating system resilient to disturbance and climate c
- Building connections with nature and your community
- Diversity of animals
- Biodiversity in wildlife context
- Having a variety of plants
- Providing a natural diverse and healthy habitat
- Diversity in plant species
- Community Gardeners

Questions: "As a chef, what does campus biodiversity mean to you?" Note: This is not the complete data set.

Students Q11 Q13 Gardeners March 30 Chefs Q11

### Q12 - 11. As a chef/cook, what does campus biodiversity mean to you?

11. As a chef/cook, what does campus biodiversity mean to you?

having different type of food inspired from other cultures

It means having the world explore within taste

This movement aware of our ecosystem how to protect from the crucial urban ecosystem.

Supporting biodiverse producers and educating students/ staff about biodiverse foods.

Today's food system is limiting our global diet to four major crops; corn, rice, soy and potatoes. This limited diet affects both our health and the planet. By supporting under utilized crops in our menus we contribute to saving our planets biodiversity. Designing a menu should be a conscious and responsible act. Being mindful of the environmental impact as well as flavour and nutrition.

Improve diets and strengthen food system

utilizing a variety of different ingredients to provide balanced meals and menus

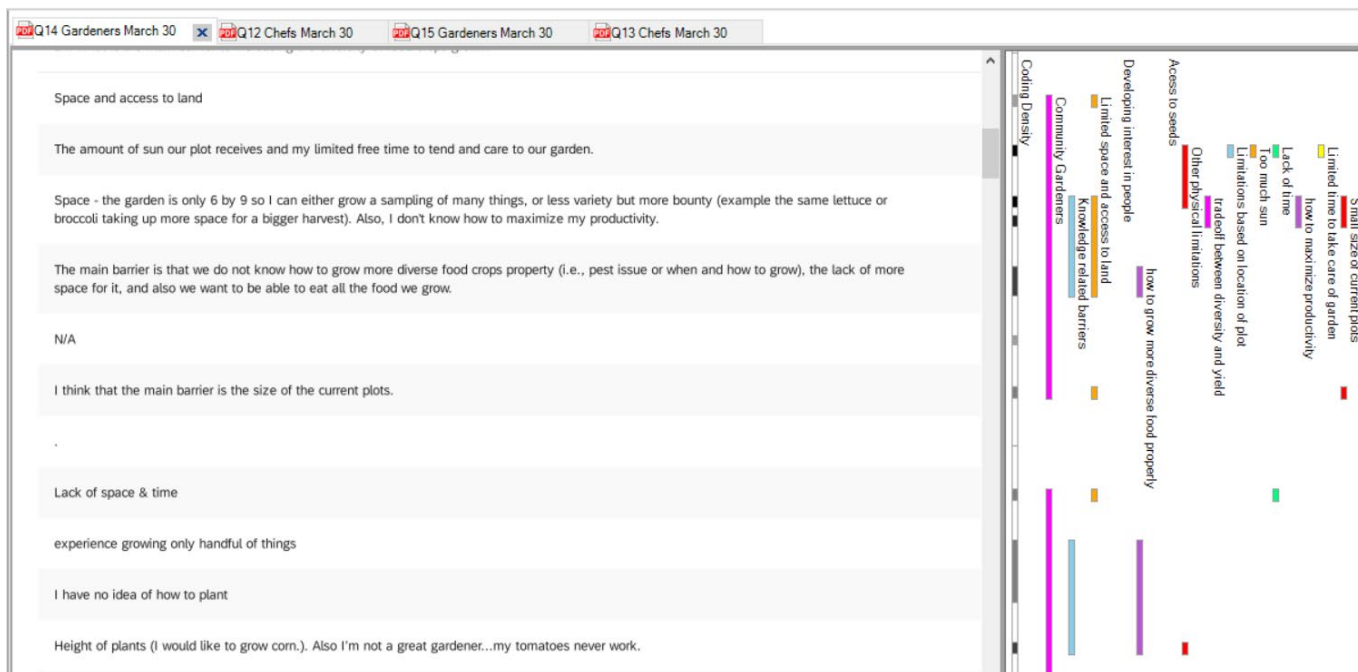
Campus biodiversity, to me means having more variety of products brought in as well as a larger amount of local product available to us in the kitchens on campus.

Introducing students/staff to new items that they may not have seen or had little contact with.

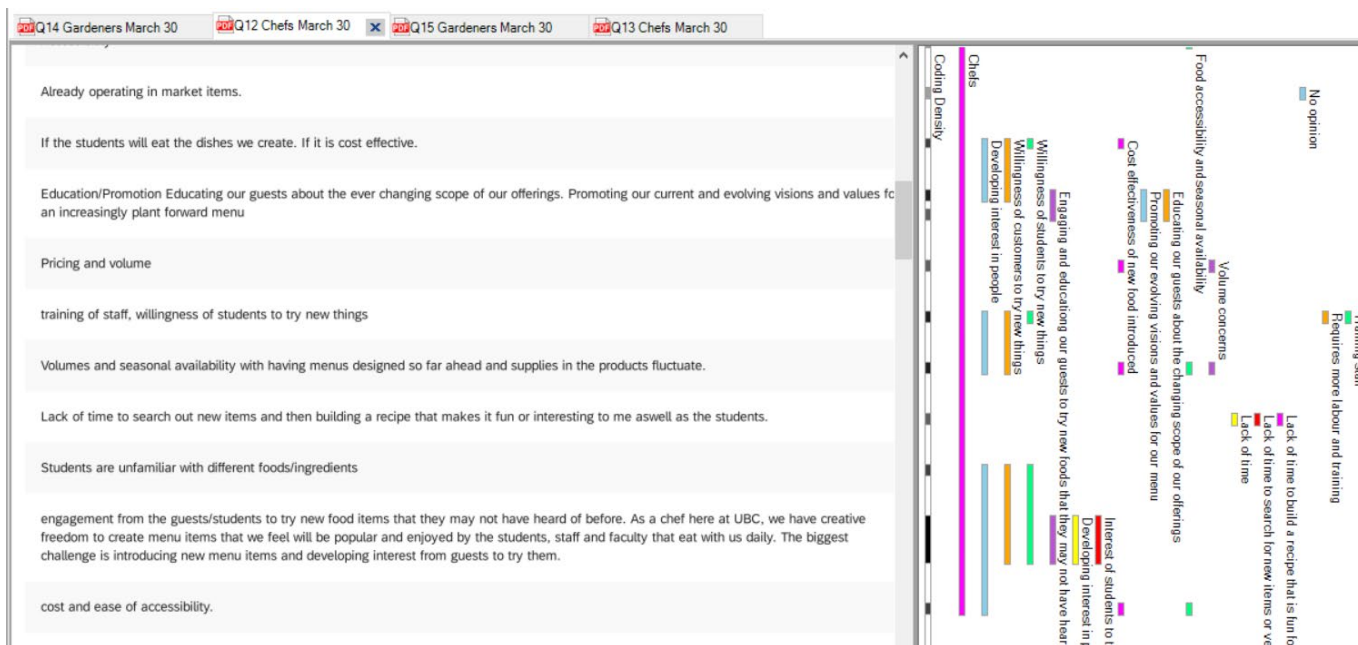
**Coding Density**

- Utilizing a variety of diffe
- Supporting loc-
- Supporting biodiverse producers
- Supporting biodiversity through the food we eat
- Including of many different cultures
- Variety of foods inspired from other cultures
- Exploring new flavours
- Education about biodiverse foods
- Biodiversity being integrated in the education curriculum
- Being environmentally responsible when designi
- Strengthening our food system
- Movement to protect ecosystem and increase resilience of campus
- Improving diets and nutrition
- Having diversity in the food we eat
- Biodiversity in food consumption
- Exploring new tastes from other cuisines

Question: "What is the main barrier to increasing the diversity of food crops grown in your community garden?"  
 Note: This is not the complete data set.



Question: “What is the main barrier to increasing the diversity of food served by UBC Food Services?” Note: This is not the complete data set.



Question: “Do you have any recommendations on how to improve the diversity of food crops grown in your community garden?” Note: This is not the complete data set.

Creative uses of vertical planting and unused neglected areas.

In normal, non-covid times, my suggestion would be some sort of seed fair at the farm where folks could buy seeds and talk to those knowledgeable about the crops

More shared gardens for commonly grown things throughout the community garden (ex. a designated salad garden, a designated italian garden, a designated herb garden) so that individual plots can experiment with other plants (corn! radicchio! etc)

Most gardeners probably can benefit from some information on what is suitable to grow in our climate and how to grow them, as well as how to obtain proper seed sources for them. Armed with this information, people may be more interested in trying out diverse food crops or ornamental plants. Our community garden, Hawthorn, is right next to a patch of forest and I would like to try to get rid of the invasive plants now growing in the forest patch. The invasive plant species I observed in the forest patch include English Holly, Himalayan blackberry, Scotch bloom and, to a less extent, English Ivy.

N/A

Here are my recommendations: 1. Create a database of all the different plants found in each garden. 2. Create a bank of seeds that can be exchanged with all the the gardeners at all the gardens at UBC. 3. Educate all the gardeners on how to identify-collect and store seeds for coming seasons.

Gentle encouragement & showing possibilities of diverse food crops. Some prefer to grow what they wish to grow.

The main complaint is that people in recent years have become really inconsiderate of other gardeners. Etiquette should be mandated

**Coding Density**

- More information on what's suitable to grow in our climate and how to grow
- More information on how to obtain proper seeds for these diverse plants
- More seed sharing or exchanging between
- English holly, Himalayan blackberry, Scotch bloom and English Ivy
- More information on how to get rid of invasive species
- Encouraging shar
- growing tomatoes at the Anthropology building space
- growing tomatoes on David Lam building space
- Showcasing the benefits of growing diverse crops
- Better marketing a
- Having a communication network between all UBC community gardeners
- Expanding gardening space
- Building a strong communication network with the community
- More technical information resources
- Implementing relevant and practical resources
- Community Gardeners

Question: "Do you have any recommendations on how to improve the diversity of food served by UBC Food Services?" Note: This is not the complete data set.

Try increasing indigenous food connections that isn't Bannock

I personally like local food and bit of negative thoughts on new implementing new species.

It has to come from up top (Nutrition/ executive chef/ purchasing) and we create using what they give us.

Better marketing of our visions and values in relation to the guest. Better marketing of the UBC farm veg and how we utilize it in our kitchens. Literally farm to fork and right on campus!

Spread the words, bring awareness to customer.

storytelling and sampling, switch to AYCTE in residence dining so students can try new things without having to commit their spend to a new item

Help us to process more of the vegetables we grow on campus, on campus. Perhaps a facility with appropriate machinery to clean and process produce would help this?

Continued pop ups and time to test these items before trying them on mass scale. One a month have the chef of the unit bring in a different item for the staff to try and then challenge them to bring in an idea using the item. Either as main part of dish or side for square meal vegetables.

More training in the staff

Education on what biodiversity is on campus and why it is important in relation to the food system and to climate action goals. Knowledge sharing is a big gap in how we are able to introduce new food items to the public and get worthwhile engagement to continue to try and buy these new items.

building better partnerships with other local farms and utilizing more menus using same items across campus in order to buy more from farms to maintain a strong partnership and build growth.

**Coding Density**

- Story telling
- Having more free samplings for students
- Switching to an All You Care To Eat meal plans in student res
- Having a facility with appropriate machinery to clean
- Having more means to process vegetables grown on
- Having more opportunities to engage in biodiversity events
- Chefs bringing a new ingredient and che
- Having more encouragement from exec
- Diversifying current food menus and meal plans
- More education on what is biodiversity and how it is connected to the food system
- Implementing relevant and practical resources
- Encouraging sharing of knowledge to continue to try new food items
- Better marketing and strategies to bring awareness of diversity in food
- Building a strong communication network with the community
- Building better partnerships with other local farms and utilizing more menus using same items across campus in order to buy more from farms to maintain a strong partnership and build growth.
- Chiefs