

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Increasing Plant Based Food Literacy and Skills - Graduate Student Society (GSS)

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Executive Summary

With a greater emphasis being placed on promoting both health and environmental wellbeing, governmental agencies and stakeholders alike are increasing emphasis on plant-forward eating. The University of British Columbia's Food and Nutrition Committee is acting by forming a working group known as the Plant Forward Food Initiative. This group looks to promote plant-based foods and food literacy amongst multiple target groups within the campus. In working with the University of British Columbia (UBC) Graduate Student Society (GSS) and the UBC Social Ecological Economic Developmental Studies (SEEDS) team, this initiative identifies current and prospective graduate students as a potential target group for a plant-based meal initiative. The mission of the GSS to promote a healthy, positive, sustainable, and affordable lifestyle for their students falls directly in line with the intentional benefits of a plant-forward diet approach. The objective of the GSS is to remove financial, and physical access barriers to graduate education at UBC, which aligns with the mission to promote plant-forward foods.

Our team is tasked with the development of informative media, in the mode of a generalized infographic pertaining to plant-based food literacy. This infographic is intending to be distributed to the diverse graduate student population, and incoming graduate students to UBC. Our infographic is to be easily modifiable, accessible, and distributable for many years to come. To test the efficacy of the infographic we plan to present the first draft to a small population of GSS students, and request feedback on the content. Due to the nature of UBC's winter term, we are only able to generate, and evaluate short-term objectives for this project. Through means of Google Forms, we will formulate multiple pre-/post-surveys, to determine the efficacy of our interventions. Objectives that are longer in term, are made based on the assumption of the continued success of our initial stimulus. Unfortunately, we will be unable to evaluate these objectives. We hope that our initial intervention initiates a diffusion of innovation that ultimately leads to a greater majority of graduate students adopting more plant-based meals. Along with this objective, we eventually aim to have a full plant-based initiative for all of UBC's food services.

Introduction

The University of British Columbia (UBC) Graduate Student Society (GSS) is an organization that was started in 1962, on the UBC Vancouver campus. UBC and the UBC GSS recognize that graduate students, are at a critical point in their lives for shaping healthy lifestyle behaviours ("Wellbeing Strategic Framework", 2019). One way to approach this practice of shaping healthy lifestyle behaviours, is through improving plant-forward (also known as plant-based) food literacy among UBC graduate students ("UBC Action Framework for a Nutritionally Sound Campus", 2017). For this project, we will define plant-forward eating patterns as focusing on foods primarily from plants, including fruits and vegetables, nuts, seeds, oils, whole grains, legumes, and beans. This does not mean the diet is strictly vegetarian nor vegan, rather, the emphasis is on choosing proportionately more foods from plant sources.

The project intends to improve plant-forward food literacy for the diverse population of over 10,000 UBC graduate students on the Vancouver campus, ("Constitution, Policies & Strategy", 2019). This is an important undertaking, because plant-forward eating has been shown to be more sustainable for the planet, have higher positive health effects, and can be a good way to save money on food (Paetsch, 2020). Thus, the key stakeholders for our project include, the UBC GSS, the Plant Forward Food Initiative group, and the UBC Social Ecological Economic Development (SEEDS) team.

The mission of the collaboration between the UBC FNH 473 team and the UBC SEEDS GSS team, is to address student health and wellbeing as well as planetary health through increasing plant-forward food literacy among UBC graduate students. This will be done by developing plant-forward nutrition-related knowledge among this population ("UBC Action Framework for a Nutritionally Sound Campus", 2017). The UBC FNH 473 team aims to engage the graduate students in order to identify the population's interest, knowledge of, and barriers to eating plant-forward foods. The 473 team will then develop an infographic that will be presented at a GSS Lunch and Learn event taking place on March 4th, 2020 to obtain feedback from the key stakeholders before undergoing final revisions. The goal of the project is to create a resource for graduate students that can be used to implement plant-forward food practices, and increase literacy for future GSS events. We also hope to increase plant-forward food literacy in the graduate student population.

Situation Assessment and Planning Framework

i. Problems

The results compiled from the “Plant-forward pre-survey” included 37 responses from GSS students (Plant-forward survey, 2019). These responses indicate that 67.5% of the survey population currently practice a plant-forward diet for 5 or more days a week, with an additional 18.9% following a plant-forward diet 3 to 4 days a week, and only 5.4% of the population rarely consuming a plant-forward diet (see Appendix C2). Furthermore, all of the participant responses show willingness to adopt a plant-forward diet, with 81.1% of them stating a high level of preparedness to integrate more plant-forward foods into their diet (see Appendix C2). Overall, the respondents show a strong passion for a plant-forward diet, though these responses might show bias, since people who support the plant-forward dietary patterns we assume to be more responsive to this survey.

Despite the evident enthusiasm by these responses, this population may face barriers that prevent them from adopting a plant-forward diet. The pre-survey highlights that convenience, lack of knowledge on plant-forward eating, finances, cultural needs, and nutrition concerns are some of the main barriers that the target population face for adopting a plant-forward diet. Thus, the project’s primary problem is that these barriers, may prevent individuals in the graduate student population from consuming a plant-forward diet.

Lack of knowledge is one of the apparent barriers that the UBC graduate student population faces in adopting a plant-forward diet. This is similar to previous findings made by Lea et al. (2006), who found that the strongest barrier to adopting a plant-forward diet in Australia, was a lack of information. Based on the responses to our pre-survey, a high percentage of respondents, report being well-informed (see Appendix C2). Despite this however, 40% of the participants consider “lack of knowledge,” such as not knowing meat alternatives or recipes for plant-forward meals, as barriers to consuming a plant-forward diet (see Appendix C2).

Past studies also highlight that participants commonly perceive consuming a plant-forward diet as “expensive,” (Lea et al., 2006; Reipurth et al., 2019). This perception arises in our project, as the GSS marketing director Ben Hill, emphasizes that issues surrounding finances is a large barrier for graduate students, due to their relatively limited financial capabilities (Personal communication, January 27, 2020). The annual Student Satisfaction Survey (2019) supports this

idea by showing 45% of the respondents consider finances as a factor causing them stress or anxiety, on a regular basis within the past year. From the responses of our survey, 26.7% of the respondents choose “money,” as the barrier to consume a plant-forward diet. Further indicating that, financial budget could be a barrier for UBC graduate students in proceeding with a plant-forward diet.

As culture heavily affects, and shapes an individual’s dietary choices, some students may have differing attitudes towards plant-forward diets, because of their cultural preferences and traditions (Pohjolainen, 2015). From the UBC Student Satisfaction Survey (2019), 39% of the 714 participants identify as international students. Moreover, 20% of our graduate student population that was surveyed consider “cultural needs” to be a barrier to consuming a plant-forward diet. Thus, by taking the importance of culture and traditions of diet into consideration, it suggests that cultural backgrounds can be an additional problem for eating a plant-forward diet.

In addition to the identifiable barriers, other potential problems that may also contribute are nutrition concerns, family influences, and health conditions (Reipurth et al., 2019; Lea et al., 2006). According to the responses from our pre-survey, 60% of the graduate students also have nutrition concerns, such as protein and/or vitamin B12 inadequacy, preventing them from adopting this diet (see Appendix C2). Negative health outcomes, is another hurdle to overcome when adopting a plant-forward diet. This is evident in the 2019 annual survey report from the GSS, stating that 12.2% of respondents identify as having permanent or long-term disabilities/health conditions, including diabetes, epilepsy, arthritis, ADHD, dyslexia, or physical impairments. Another 18.54% of these respondents, identify as having mental health disorders, such as depression.

ii. Behaviours

According to Dietz (1995), an individual's choice of diet is due to a combination of psycho-social factors, and perceptual benefits of the diet. Factors such as beliefs, attitudes, norms, and values play a big role in food choice. A plant-forward diet encompasses vegan and vegetarian practices, as it emphasizes foods from plant sources. The intentional benefits of a vegetarian diet include improved health, animal welfare, and environmental prosperity. Additionally, according to recent research, choosing a vegan diet primarily stems from a concern for animal welfare or health benefits, which subsequently impacts an individual's consumption of

plant-specific foods (Radnitz, 2015). These behaviours and views may be seen in the graduate student population that already practices plant-forward diets like vegetarianism or veganism.

As outlined in the survey, 26.7% of respondents identify finances as a barrier to adopting a more plant-forward diet (Appendix C2). According to the 2019 GSS survey (Barros Henrique), 56% of respondents experience financial stress, related to the allocation of funding for their studies. This financial stress would likely affect their food intake, and food purchasing. Furthermore, the 2018 AMS Academic Experience Survey outlines that 42% of graduate students at UBC, have concerns about not having enough money for sufficient food in the past year (MacDonald, 2018). This level of food insecurity is similar to the Meal Exchange Canada statistics outlining that 40% of students at Canadian universities experience some degree of food insecurity (Silverthorn, 2016). Food insecurity may pose as a barrier to students wanting to adopt a plant-forward diet, but may not have the financial means to do so.

However, some students may be resistant to adopting a more plant-forward diet due to extenuating barriers. A common barrier in Australia to adopting a plant-forward diet seen in Lea's (2003) study, is the enjoyment of eating meat, and an unwillingness to alter eating habits. Moreover, people may face barriers when they try to change their diet, such as making alterations to incorporate more plant-forward foods. Individuals may have attitudinal barriers to dietary changes, like believing their diet is already balanced/healthy, and requires no change (Lea, 2003). Similarly, 53.3% of the graduate student population identify nutrition concerns as a prior barrier to adopting a plant-forward diet in our pre-survey. This may stem from the belief that plant-forward diets lack protein and other essential nutrients.

As graduate students have numerous academic and personal commitments, time is also an extenuating factor. Time is known to be a large barrier to the specific health behaviours that influence our food choices (Balch, 1997). It is often perceived that consuming more fruits and vegetables is inconvenient and time-consuming (Balch, 1997). As outlined above, there exists a multitude of barriers that may halt an individual's choice to adopt a plant-forward diet. However, some of these barriers can be overcome through improving the individual's plant-food literacy.

iii. Mediating Factors

On an individual level, the stakeholders reveal that budgeting, and the cost of food, is of high priority for our population of interest. In the 2019 GSS Student Satisfaction Survey, 76% of students report that finances are at minimum, and this “somewhat” causes them stress or anxiety in their day to day lives (Barros Henriques, 2019). The survey had a response rate of approximately 8% of the graduate student population, and we will utilize this number to reflect the general trend of concern for budget-friendliness within graduate students. This survey along with the data, that 40% of university students face some degree of food insecurity, supports the belief that cost is likely a mediating factor affecting GSS students from adopting a plant-forward diet (Kozicky, 2019).

On an interpersonal level, the mediating factors for the graduate student population, could be the accessibility of plant-forward eating in the communities of UBC and GSS. When considering GSS students as part of the UBC community, we can examine UBC student’s views on adopting plant-forward diets. The university is showing an interest in promoting plant-forward eating, as demonstrated through their vision and values statement (Responsibility UBC Food Service, 2020). There is also a variety of plant-forward restaurants, and plant-forward options at restaurants, reflecting the growing interest for plant-forward foods on campus. Within the GSS community specifically, the interest in plant-forward initiatives is less clear. At GSS events they are ordering approximately 30% vegetarian options, suggesting that the curiosity within the population to consume plant-forward meals is roughly 1/3rd of their population (Ben Hill, personal communication, January 27 2020). The GSS is currently responding to the growing interest in plant-forward food choices, by deciding to offer a plant-forward eating workshop as their lunch-and-learn for the month of March.

On an environmental level, we consider a mediating factor being the promotion of plant-forward eating as a health benefit from a public health perspective. The GSS student satisfaction survey found that 42% of students have intrigue in participating in wellness activities, supporting the fact that health, and wellbeing are a concern for this population (Barros Henriques, 2019). Additionally, the concern for mental health within the population suggests that, there can be a possible mental health benefit from healthier food choices (Rossa-Roccor, 2019).

iv. Health Behaviour Theory

We chose to use the Diffusion of Innovations theory as our health behaviour theory for this project. This theory is one that works at the community level, which we identify as being highly important. Since our primary audience is a diverse population of over 10,000 graduate students on the UBC Vancouver campus (Hammond, 2020), this theory is able to best capture our target. Due to the diverse landscape, it would be hard to create a resource, or event that could reach all 10,000 students individually. Thus, we will rely on the concepts of the adoption curve, and S curve (from within the Diffusion of Innovation theory), to assist us in increasing plant-forward food literacy and skills within this vast audience (Hammond, 2020). The adoption curve allows us to examine the 5 existing adopter groups within our broad target population: the innovators, early adopters, early majority, late majority and laggards (Hammond, 2020). Our resource intends to target the early adopters and early majority. While keeping in mind the need to market to each of these individual adopter groups, we will formulate a resource that could apply to the totality of the primary audience ("Diffusion of Innovation Theory: The Adoption Curve", 2015). Our intentions for the intervention, is for it to be informative, and engaging for the early adopters and early majority, while staying readily available for the late majority and laggards to embrace. We assume that the resource will not be as beneficial for the innovators, as they likely already possess this information. However, it will remain accessible to them if they require. In order to achieve such a feat, we choose to include various stages of information on plant-forward diets within our infographic resource. The S curve allows us as project planners to measure the rate of adoption of the innovation. Meaning that, it allows us to measure the rate at which people in a community adopt the innovation ("Diffusion of Innovation Theory: The "S" Curve", 2015). This will be important to assess over time, to see if the stimulus is successful in meeting the long-term objectives, and ultimate goal for this project.

The focuses of the Diffusion of Innovations theory, best supports our needs, in comparison to the other community-oriented "Community Organization theory". These concepts from the Diffusion of Innovations Theory include: innovation, communication channels, social system, and time (Hammond, 2020). From the results of the pre-survey we sent to our target population, our group highlights existing gaps of knowledge pertaining plant-forward diets. For example, perception of increased cost of plant-forward diets, as well as perception their current diet is adequate in health needs. We will then generate an intervention to introduce new ideas to

target these gaps identified by the pre-survey, in hopes that this will impact the behaviours of graduate students. Thus, we are able to address the concept of innovation. Since the primary output for this project is an infographic resource, it is essential that we impact the communication channels of the graduate students (Hammond, 2020). We will use various electronic communication forms from within the graduate student population, to influence how ideas about plant-forward eating are to be circulating of our infographic. With a highly diverse audience, an infographic is desirable as it allows information to be spread through both pictures (visual), and words (reading/writing). This addresses two learning styles, which is more than what can be accomplished from a text-only newsletter (Hammond, 2020). Our infographic, also aims to influence the behaviours (the kinesthetic component of VARK), of our target population (“VARK”, 2020); (Hammond, 2020). Finally, both the concepts of social systems, and time are addressed, through our work with the UBC GSS and UBC SEEDS organization. The UBC GSS is an important social system to utilize in order to best reach the 5 subgroups described to be within the adoption curve ("Diffusion of Innovation Theory: The Adoption Curve", 2015). It is our hope that after stimulating the early adopters and early majority, both of their plant-forward food literacy and food skills will increase. This knowledge will then hopefully spread amongst the graduate student population as a whole, and over time, the laggards will also adopt. Thus, a complete diffusion will be achieved.

Project Goal and Objectives

Our team hopes to expand the dietary choices of students within the University of British Columbia's Graduate Student Society, by encouraging more plant-forward food options, and developing their plant-forward food literacy.

By studying the diffusion of innovation theory, we can develop and evaluate multiple objectives, that are relevant to our project. Unfortunately, due to the nature of UBC's winter semester, we are only able to judge our short-term objectives. However, medium- and long-term objectives that coincide with our team's expectations will still be manufactured.

Our objectives include:

Short Term (<1 Year from Intervention Date)

1. Develop an infographic, that can be consistently edited, and distributed, amongst the graduate student population. The efficacy of this infographic will be evaluated through responses generated from the annual 2nd quarter Graduate Student Satisfaction Survey in 2021. This information will indicate a use of this resource by 45% of the GSS population.
2. Increase UBC graduate students' awareness of plant-forward options, by presenting our infographic to a sample of around 50 graduate students at a GSS Lunch and Learn workshop focused on planning healthy meals on a budget, on March 4th 2020. The effectiveness of this outreach will be evaluated through in-person feedback, and feedback gathered from the post-event survey.

Medium Term (1 - 3 years from Intervention Date)

3. Create a plant-forward infographic resource, that could be further edited by future FNH 473 students, and stakeholders of the GSS. These subsequent parties should modify the resource yearly to keep it relevant to the needs of the current graduate student population.
4. Increase the amount of plant-forward meals to 3-4 plant-forward options offered to graduate students at GSS events by March, 2022.

Long Term (>3 years from Intervention)

5. Install a Graduate Student Society (GSS) led initiative that provides plant-forward meals only during GSS sanctioned events.

We hope to minimize the number of deviating students as much as possible, by consistently providing in-depth, and relatable materials, that apply to every micro graduate student population.

Description of Project Outputs:

The major output of this project, is an infographic focusing on plant-forward eating. This infographic aims to reach the entire Graduate Student population at UBC, as this is the primary audience. The Graduate Student population at UBC is large, encompassing a population of over 10,000 students on the UBC Vancouver campus ("Constitution, Policies & Strategy", 2019). Since our primary audience is so vast, we chose to use the diffusion of innovation theoretical framework, as we believe it is important to produce an output that could be used by the whole community of diverse graduate students. After selecting this framework, we chose to create a resource as our main output, as opposed to an event, as it allows us to best reach such an audience. An event, in contrast to the infographic, is a less desirable option due to the busy schedules of graduate students, and the limited capacity (typically 50 students) of events ("GSS Events", 2020). These limitations would mean that it would not be possible to be equally impactful for the whole target audience. Moreover, we feel that an event would have greater emphasis on how to cook plant-forward meals, rather than on increasing plant-forward food literacy. This is an important distinction to note, as the goal of the project is to create a resource for graduate students that can be used to implement plant-forward food practices, and literacy in future GSS events. We also need to focus on increasing plant-forward food literacy in this population.

An infographic is employed in our project to relay complex plant-forward information in a simple, yet engaging manner. An infographic is proven to be an effective educational tool, as it delivers information to students in an easily readable, and scannable format (Stadtlander, 2016). Additionally, as infographics are visually appealing with graphics and colour schemes, it encourages viewers to engage in the content (Lankow, 2012). Moreover, the use of visual aids is an effective strategy to help people retain information, as viewing graphics draws upon nonvisual information stored in our long-term memory. This thereby improves retention rates of the information viewed (Ware, 2013). Thus, the infographic enables us to easily convey complex nutritional information on plant-forward eating, in an easily digestible format.

Although there is plenty of information we would have liked to include in the infographic, we opted to focus on smaller sub-topics of plant-forward eating due to time and space constraints. The information gathered from the pre-survey, provides insight on the graduate students' current knowledge, and opinions on plant-forward eating and dietary habits. This guides our infographic

development process. In conjunction with our community partners, (GSS and UBC SEEDS representatives) and the graduate students' response, we narrowed down our list of topics to the three most pertinent, and relevant to the target population; the what, why and how of plant-forward eating.

The infographic specifically details the environmental, health, and cost benefits of consuming a plant-forward diet, as well as tips on how to approach consuming a plant-forward diet. The infographic includes a brief definition of plant-forward eating; this information is fundamental to include as we want to emphasize that this is not a restrictive diet. Rather it being an eating pattern focusing on incorporating more foods from plant sources. Restrictive dieting has limited success, and can be hard to sustain in the long term (Benton, 2017). Moreover, we want to emphasize the 2019 Canada's Food Guide message of choosing plant-forward foods more often through the infographic. Thus, we include a plate diagram consisting of plant-forward protein choices, vegetables and fruits, and whole grains to relay this idea through visual aids. Similar to the 2019 Canada's Food Guide, the infographic is developed to encourage plant-forward eating, and promote healthy eating patterns for the graduate student population.

One of the topics we chose to include on the infographic, are the benefits of eating plant-forward. We chose to highlight the benefits of plant-forward eating, to encourage students to choose more plant-forward options. Illustrating the environmental, health and monetary benefits through graphics and text, are meant to bias students shopping patterns, when they next go to the grocery store. According to research, participants are more likely to change behaviours if there are potential benefits, and positive impacts that result from their change (Kiviniemi, 2008). Emphasizing the positive impact that an individual could have on the environment through switching to plant-forward foods, such as a reduction in pollution, deforestation, and destruction of topsoil, is employed as a tool to sway student's food choices. Furthermore, it was important to address these environmental consequences to the food system, in light of the escalating concerns of climate change and environmental degradation among Canadians (Seeds and Rocha, 2018). Additionally, outlining some personal benefits, such as reduction in the risk of chronic diseases, and financial costs, associated with eating more plant-forward, is another tactic used to motivate students to consume this diet. This "win-win" messaging evident in the infographic, showcases how a plant-forward diet pattern can promote both better health and environmental sustainability (Nelson et al, 2016). Further, messages with multiple benefits, such as the message in the

infographic encompassing benefits to health, environment and economy, are better received (Seeds and Rocha, 2018). In addition, the infographic highlights the linkage between food patterns, external costs to the healthcare system, and the ecosystem (Seeds and Rocha, 2018). Outlining the benefits of plant-forward eating in the infographic is done to gather interest, and motivation for the graduate student population to choose more plant-forward food options.

During our initial meetings with our GSS community partner, emphasis is placed on the financial constraints that most graduate students are facing. Thus, we include tips on shopping on a budget, in which we outline ways to save money when purchasing plant-forward foods. Our tips incorporate but are not limited to: purchasing in bulk, using canned foods, and buying local produce. Moreover, we took into consideration the GSS's population demographic: busy graduate students with limited time. Therefore, we cover some preparation tips to help the students save on time when preparing and cooking meals. For example, we suggest cooking in bulk and freezing leftovers, pre-soaking grains, and using canned legumes. Finally, we conducted a pre-survey with the graduate student population to gather information from graduate students on their current knowledge, and opinion on plant-forward diets and eating habits.

Throughout the development of the infographic we conversed with our community partners weekly via email in order to receive constructive feedback on the materials, and content in development. Implementation of the feedback received from our community partners; such as rewording certain phrases (i.e. changing 'chronic illnesses' to 'chronic diseases'), emphasizing more beans, encouraging students to buy local produce, as well as informing where they could find information pertaining to shopping for locally produced foods. In addition to the communication with the partners, we also presented the infographic at a GSS lunch and learn workshop to receive feedback from graduate students in attendance. The initial response from the students was overall positive, as most students commended the visual appeal. Remarks are made from the graduate students, pertaining towards plant-forward recipes for inspiration, which is integrated into our final infographic. In addition to the presentation, we sent out a follow-up survey to the attendees for additional feedback. However, despite receiving no responses from the follow-up survey; we are still able to incorporate the in-person feedback received relating to the infographic. The feedback received from the GSS representatives, UBC SEEDS team and the graduate student population is apparent within the final infographic.

Creating an infographic allows us to develop a resource that can be easily reused, and we wanted a resource that the graduate student population could bring with them while grocery shopping. It is important for this resource to be useful when shopping, as it not only helps students to identify what a plant-forward diet is, but also how to eat, and shop for a plant-forward diet. Further, it is important that this resource be available in both a printable, and an online format, as we assume that graduate students have different styles of learning, and varying access to technology.

Evaluation Plan

In order to evaluate the extent to which the project achieves our objectives, we used a set of two surveys. The first survey was an online pre-survey, which we sent out to the UBC graduate student population. We focused on assessing what they already knew about plant-forward eating, what they wanted to know, and if they could see themselves implementing a plant-forward diet (Appendix C1). We used these responses, in addition to input from our community partner (another key stakeholder) to develop our infographic. We then sent out an online post-survey that asked for in-person feedback from the graduate student population at UBC Vancouver, who attended our presentation of the first draft of our infographic. This presentation was done at a Lunch-and-Learn event on March 4th (Appendix C3). The online post-survey, and in-person feedback (on March 4th) therefore serves as the tools we used to evaluate the efficacy of our project, at achieving our stated objectives. Specifically, these two methods of evaluation provided insight, as to if general awareness of plant-forward food options for graduate students at UBC is increasing through the infographic (our 2nd objective), and if a developmental foundation pertaining to plant-forward food knowledge is being made (our 3rd objective).

While we have implemented both a post-survey, and asked for in-person feedback as methods of evaluation already, we believe that there is room for more evaluative processes to be made. This is critical, since the Lunch-and-Learn event on March 4th hosted around 50 graduate students, and thus a limitation is that, we are only able to receive feedback on the survey from these 50 graduate students. Further, not all 50 of these graduate students gave feedback, as we received 0 responses from our online post-survey that was emailed to these students. We believe an ideal process for evaluation, would be to follow-up with the graduate student population at UBC Vancouver over the next few months (i.e. in 1 month, 3, month, 6 months) to see how useful they have found the infographic. This is important since the resource is created to be useful when students are grocery shopping, as well as when they are preparing plant-forward meals. Moreover, it is important to follow-up with our key stakeholders and primary audience in particular to see how the GSS events have evolved to include more plant-forward options. Having more plant-food options is stated as being our 4th and 5th objectives for the project. The intention of the infographic is to be a tool that is useful for the graduate students on a community level, which is why we selected the diffusion of innovation theoretical framework to support us in

creating this resource (National Institutes of Health, U.S. Department of Health and Human Services, pg.23).

To assist in promoting a plant-forward diet for both current and incoming UBC Vancouver graduate students, we will construct a consistently usable resource. Since this resource is reusable, similar surveys to our pre-survey and post-survey we sent to graduate students for feedback, may be sent to this primary audience every year to assess students' knowledge and awareness. These surveys may help to provide insight to the continual usefulness of the resource, as well as any barriers, or gaps the population is facing when using this resource (or maybe they are not using it at all - again, it is important to assess this on an ongoing basis). In addition, assessment of students' dietary patterns such as answer questions from a dietary assessment tool, like a food frequency questionnaire (FFQ), or a daily (preferable over a period of multiple days) food record. Moreover, usefulness of the infographic can be evaluated by incorporating questions into an annual GSS student satisfaction survey, after more plant-forward meals are made available to students attending GSS events. Responses to this aforementioned survey, as well as to other FFQs, and/or food records provide insight as to whether or not, our first objective (to develop an adjustable form of outreach that can be consistently edited and distributed) is achieved. We assume edits may need to be made to the infographic as our primary audience continuously evolves and changes.

Within 3 to 5 years, we hope that GSS can provide more plant-forward food options to the graduate students attending their events. We also hope that the infographic aids the GSS and graduate student population alike, in being able to come up with nutritionally balanced plant-forward food options.

Conclusion

Our collaboration with the UBC GSS and UBC SEEDS team, entices the goal of enhancing health, wellbeing and encouraging environmental sustainability through the promotion of plant-forward literacy among UBC graduate students. In the short-term, we developed a plant-forward food infographic, as an educational tool to be distributed among graduate students to increase their knowledge, and awareness of plant-forward options. The draft infographic was introduced at the GSS Lunch-and-Learn to obtain feedback from the approximate 50 graduate students in attendance to make further improvements and finalizations. In the future, we recommend that the infographic continue to be used as a tool to promote plant-forward food literacy in the graduate student population. By making it available to graduate students through the resource package given at orientation, we will be able to reach students even after our team moves on. This also will align with our objective, to reach and increase plant-forward food literacy to as many students as possible from the target population. We also recommend that the GSS respond to the anticipated increase in interest of consuming a plant-forward diet, by offering more plant-forward food options at GSS events.

During this project, reinforcement of the importance of the situational assessment is obvious, as it allows us to identify commonalities within the large target population. This assessment allows us to ensure that our health behaviour theory, the outputs, and the evaluation methods, are applicable and appropriate for the target population. Additionally, we are fortunate enough to have the opportunity to interact with our target population throughout the project, and utilize their opinions towards our project development. Through this, we recognize the value of feedback from our target population, as it enables us to develop a finalized infographic that meets or exceeds their needs. We would also like to emphasize the importance of considering population feedback, as we found the most success when we incorporated critiques from the graduate student population. Finally, we learned that clear communication is crucial when working with multiple stakeholders, to ensure incorporation of everyone's point-of-view into the project. We are fortunate to have 3 separate stakeholders who are willing to contribute their resources and expertise, in order to effectively develop our clear and consistent communication methods.

Authors' Contributions

As a group we wish to highlight that we worked collectively to complete all aspects of the project. We identified the “Diffusion of Innovation Theory,” as the health behaviour theory together. We all participated in the formatting, and editing of the written report, presentation and references list. We worked together, and shared our insight to develop the questions for the pre and post surveys. We collaborated to present our draft logic model to our class. We also would like to highlight the following individual contributions that each group member made, in addition to their own individual creativity, knowledge, and expertise. Through constant and effective communication between group members, we are able to ensure an equal distribution of contributions is made.

For the report, Marcus formulated the executive summary, identified and communicated the goals and objectives, collaborated to write the author’s contributions and was responsible for the final formatting plus editing. Additionally, he was tasked with taking meeting minutes, and sharing them with the group members. He also was a contributing member to the infographic development and draft logic model presentation teams respectively.

For the report, Sarah W. completed the introduction and contributed to the elaboration on the health behaviour theory, goals and objectives, evaluation plan, and conclusion in the report. She also co-wrote the outputs section with Arshi S. She volunteered as the person of contact, and handled all correspondence with the community partners for the duration of the project. She ensured all communication summarized the information, concerns and questions of the group members. She also collaborated with An, and Hailey to complete the slides for the draft logic model presentation.

For the report, Hailey formulated the problems in the situational assessment through the analysis of the collected survey data, and a reviewing of the literature. Additionally, for the report she collaborated on the evaluation plan and the conclusion. She also contributed to completion the draft logic model presentation.

For the report, Sarah D. took sole lead researching and identifying mediating factors based on a literature review and pre-survey results, contributed to the author’s contributions, and formatted the appendices. She contributed to the decision-making process of finalizing the content of the infographic. She also participated in the GSS Lunch-and-Learn on March 4th to present the draft infographic to the graduate students.

For the report, An assisted with the justification for the health behaviour theory, and collaborated on the evaluation plan, and the conclusion. She collaborated to complete the draft logic model presentation with the aforementioned group members. She also participated in the GSS Lunch-and-Learn on March 4th to present the draft infographic to the graduate students.

For the report Arshi contributed to the elaboration on the goals and objectives, and co-wrote the project outputs with Sarah W. In addition, Arshi took sole lead researching, and identifying behaviours that contributed to the barriers to adopting a plant-forward diet based on literature review and the pre-survey results. She was the primary lead in the creation, and formatting of the pre and post surveys. She was also the primary lead for the content development, and formatting of the infographic. She participated in the GSS Lunch-and-Learn on March 4th to present the draft infographic to the graduate students.

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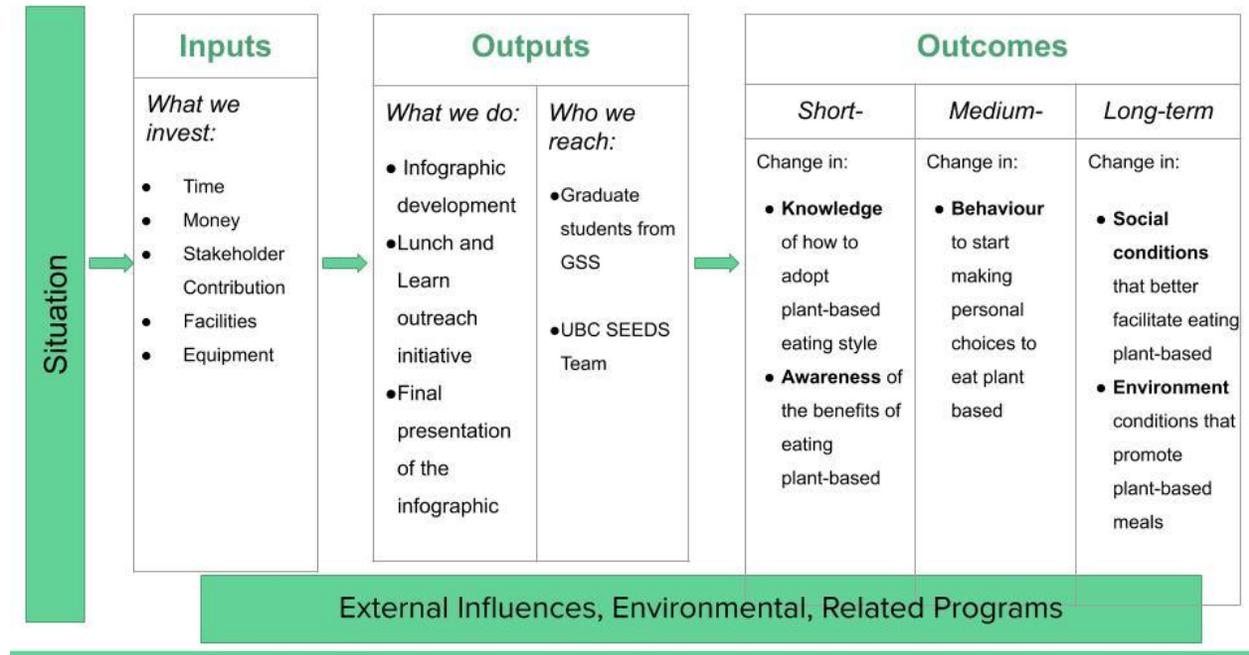
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Appendices

Appendix A

A1. Logic Model



Appendix B

B1. Newsletter of Report

SEEDS/UBC Graduate Student Society: Increasing Plant-Based Food Literacy and Skills

Our Project

Our group of 6 LFS students in FNH 473 collaborated with SEEDS and the UBC Graduate Student Society (GSS) to promote plant-based food literacy in the UBC graduate student population. We were also lucky to collaborate with the UBC Plant-Forward Initiative group who provided insight on our project. We are grateful to our project partners for sharing their time and expertise throughout the project. We would like to thank David (SEEDS), and Sarah and Melissa (Plant-Forward Initiative) for providing direction on project implementation and insight on the infographic content. We would like to thank Nicole and Ben (GSS) for their patience and for providing us with important insight specific to the GSS population. We worked together to develop an accessible and informative infographic that could be widely distributed to the GSS population. The goal of our project was to increase awareness of the benefits of plant-based eating and increase knowledge of ways to implement plant-based eating in the graduate student population.

What We Learned

Throughout the project we had the opportunity to develop collaboration skills required to work with multiple stakeholders. We also learned about program implementation for a population that is unique and diverse. We learned that the GSS population consists of many distinct sub-populations, which we tried to take into consideration when developing our infographic. We also came to learn that although the population of interest is diverse, they had common interests that unified them including the obvious education level, desire for knowledge, concern for affordability and consideration for accessibility. These common threads facilitated our development of an appropriate infographic.

Experience in Public Health Nutrition

We all thoroughly enjoyed and appreciated the learning opportunities that were presented through this project. Working in public health nutrition presents with unique challenges of balancing policy, resources, the needs of stakeholders and the needs of the target population. We appreciated the continued support of our stakeholders that ensured we had the means to develop an effective intervention.

Appendix C

C1. Pre-Survey

FNH 473 has partnered with GSS to provide a resource on plant-based eating. We are seeking feedback from graduate students on their current knowledge and opinion on plant-based diets and eating habits.

Plant-based or plant-forward eating patterns focus on foods primarily from plants. This includes fruits and vegetables, nuts, seeds, oils, whole grains, legumes, and beans. It doesn't mean that you are vegetarian or vegan and never eat meat or dairy. Rather, you are proportionately choosing more of your foods from plant sources.

1. *Rate our knowledge of plant-based dietary patterns. (1 = not knowledgeable, 5 = very knowledgeable.*
 - O 1*
 - O 2*
 - O 3*
 - O 4*
 - O 5*

2. *How often in a typical 7-day week do you follow a plant-based diet?*
 - O Rarely*
 - O 1 day*
 - O 2 days*
 - O 3 days*
 - O 4 days*
 - O 5 days*
 - O 6 days*
 - O 7 days*

3. *If you did not answer "5+days" to the above question, what are your identified barriers to consuming a plant-based diet? (choose all applicable)*
 - O Money*
 - O Convenience*
 - O Lack of knowledge - (ex. Recipes, how to prepare, meat alternatives)*
 - O Cultural needs*
 - O Nutrition concerns (i.e. protein inadequacy)*
 - O Lack of interest*
 - O Other... (fill in)*

4. *In a typical week, how often would you LIKE to be eating plant-based food.*
 - O Rarely*
 - O 1 day*
 - O 2 days*
 - O 3 days*
 - O 4 days*
 - O 5 days*

- O 6 days*
- O 7 days*

5. *On a scale of 1-10 rate your willingness/eagerness to adopt a plant-based diet? (1 = not eager/no willingness, 10 = very eager/already adopted)*

- O 1*
- O 2*
- O 3*
- O 4*
- O 5*
- O 6*
- O 7*
- O 8*
- O 9*
- O 10*

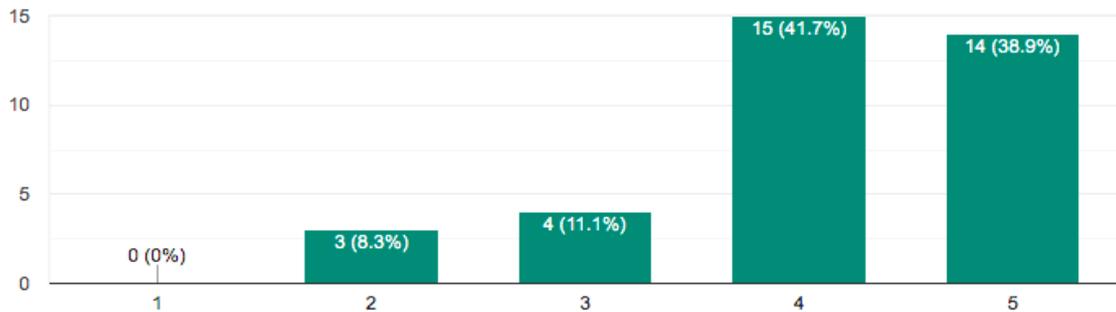
6. *Any additional comments or questions pertaining to plant-based food that you would like to see addressed: (fill in)*

7. *If you would like to be entered in a draw for a \$25 gift card to UBC food services please go to this link:*

C2. Pre-survey results

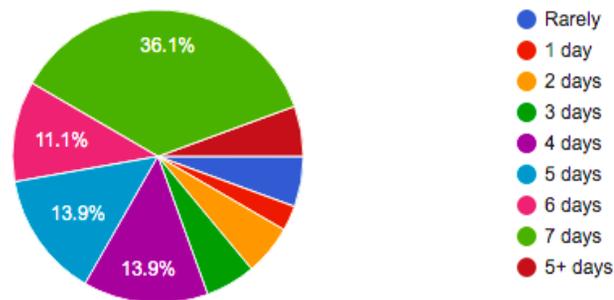
Rate your knowledge of plant-based dietary patterns. (1 = not at all knowledgeable, 5 = very knowledgeable)

36 responses



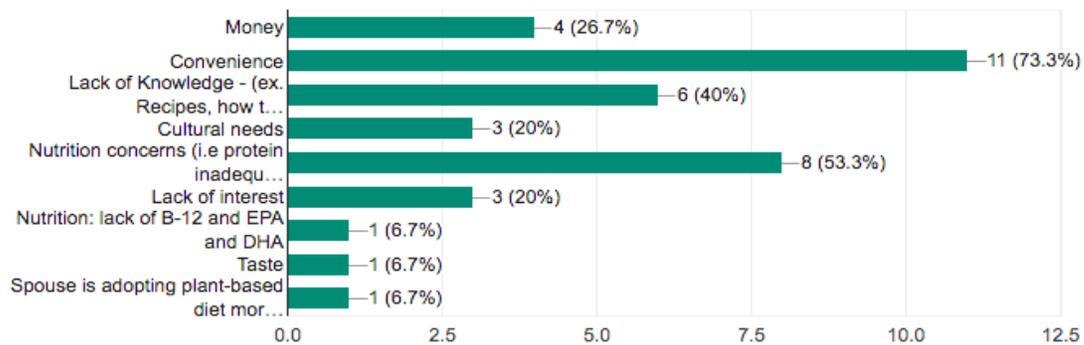
How often in a typical 7 day week do you follow a plant-based diet?

36 responses



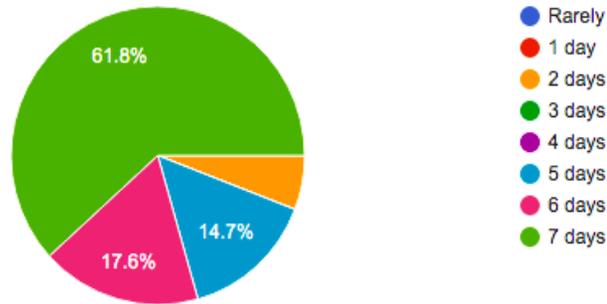
If you did not answer "5+ days" to the above question, what are your identified barriers to consuming a plant-based diet?

15 responses



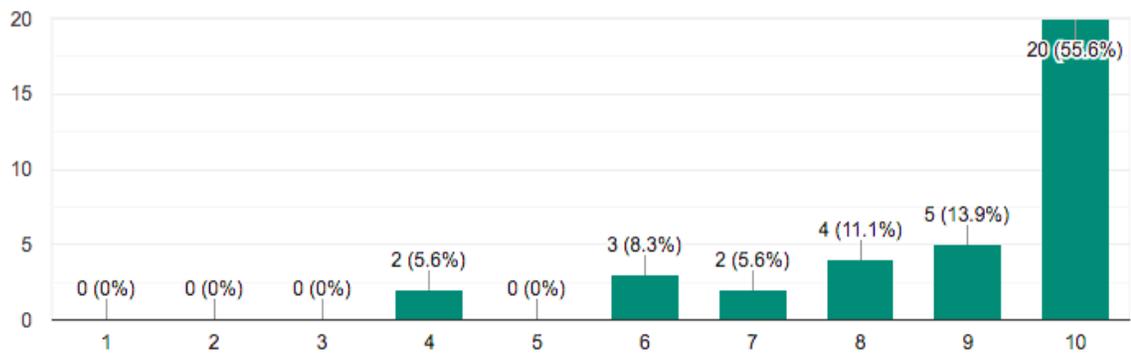
In a typical week, how often would you LIKE to be eating plant-based food.

34 responses



On a scale of 1-10 rate your willingness/eagerness to adopt a plant-based diet?

36 responses



Any additional comments or questions pertaining to plant-based food that you would like to see addressed:

15 responses

I am vegetarian, I tend to opt toward plant based products over animal when possible (\$ is limiting factor)

We need more large portion/high calorie plant based food options on campus. Most current options leave me feeling hungry afterwards.

I would like to be able to eat more plant-based meals at events on campus, including less carb-heavy vegan meals. I would also like to see more options on campus for affordable organic produce during the winter (not the best options on or next to campus). Otherwise, I love getting produce from UBC Farm markets, especially midweek campus ones.

Btw, the survey link that went out was for a work request rather than the survey, which I had to access by clicking "preview".

I don't eat much meat but dairy is a staple for me right now. I would love to participate in a short series of classes that show me how to prepare easy meals that fulfill dietary requirements. I think in-person support to develop new eating patterns, learn recipes and be inspired that plant-based eating can be easy (!) would help me make the change.

Right now, events with free food often have pizza, as it is easy and convenient, and delicious and has protein and fills you up. But, the cheese is not plant-based, so perhaps there is room to promote plant-based alternatives.

What kind of non-organic plant-based food are healthful for people compared to the same organic food?

I often have difficulty buying food products like burgers/fake chicken strips/etc that are plant-based/vegan because they get priced up for being trendy. It sucks! Sometimes I want a quick solution when I'm tired and don't want to use/don't have a bunch of fresh ingredients.

30 Day plan to shift gradually towards 100% plant based diet, benefits of partial plant based diet compared to 100% animal protein diet 10/25/50% in health/cost and other benefits

More high protein plant-based food diets

I do occasionally eat dairy or eggs, but otherwise I am on a plant-based diet!

encourage people to know where their food comes from, how industrial agriculture works (its cruelty to animals), to be more connected to the land where their food grows and the people who grow/produce it, consider the distances that some food travels before arriving on your plate - eat locally and seasonally whenever possible or at least more often

(Just FYI - the survey sent out by GSS was a "work request" that leads to the edit page for this survey. I had to click on the view icon in order to fill it out - wanted to flag so you don't have anyone making unwanted edits to your survey!)

Tips on how to ensure sufficient protein and other nutrients are being met with a plant-based diet

A barrier for me is th eating habits of my friends/family/partner

I think more departments should have plant based foods provided at department events to encourage sustainable eating.

C3. Draft-Infographic Survey

Infographic Feedback

Follow up surgery about the infographic presentation at the lunch and learn event

1. *Did you find the infographic informative?*
O Yes
O No

2. *Please expand on your response above: (fill in)*

3. *Would you use this tool in the future?*
O Yes
O No

4. *Please expand on your response above: (fill in)*

5. *Is there anything else you wish was included? If so, please explain below: (fill in)*

6. *Any further comments or feedback: (fill in)*

Appendix D

D1. Complete Infographic



PLANT-FORWARD EATING

Plant-based or plant-forward eating patterns focus on foods primarily from plants. This includes fruits and vegetables, nuts, seeds, oils, whole grains, legumes, and beans. It doesn't mean that you are vegetarian or vegan and never eat meat or dairy. Rather, you are proportionately choosing more of your foods from plant sources.

WHY



Combat climate change:

- Switching from a meat-based diet to a plant diet reduces water, lowers pollution, slows deforestation and reduces destruction of topsoil.



Positive health outcomes:

- Nutritionally adequate with increased vitamins, minerals and dietary fibre
- Reduction in the risk of chronic diseases, such as type 2 diabetes, obesity, heart disease and certain cancers.



Cost benefits:

- Plant-based proteins can be less expensive in comparison to animal proteins
- Reduction of chronic diseases leads to less stress on our Health Care system

HOW

SHOPPING PLANT-BASED ON A BUDGET

- Purchase items such as whole grains, dried beans & fruit, lentils, nuts and seeds in the bulk section
- Non-perishable items such as canned legumes, frozen fruit and vegetables and quinoa aid in reducing overall costs
- Base meals around beans, lentils, peas, chickpeas and soy
- Check out local farmers market to purchase fresh and local produce that is in season



COOKING + PREPARATION TIPS

- Cook plant-based proteins in bulk and freeze/refrigerate for later use
- Cooked dried beans can be refrigerated for 5-7 days and frozen for 6 months
- An open can of beans can be refrigerated for 3-4 days and frozen for 1-2 months
- Steam, grill, or stir-fry veggies to preserve flavour and nutrients
- Use canned beans and soak grains to save on cooking time



Plant-forwards swaps

Chicken
Ground meats
Eggs
Cheese



Tofu
Lentils or Beans
Peanut butter
Hummus

MEAL INSPIRATION

BREAKFAST IDEAS



Overnight oats:
Soak oats with nut-milk or water and top with fruit!

LUNCH IDEAS



Quinoa veggie bowl with a protein source
View link for a detailed recipe:
<https://grgo.page.link/GXZWL>

DINNER IDEAS



Lentil curry with grain of your choice!
View link for a detailed recipe:
<https://bit.ly/33E633T>

This is a student-led project in collaboration with Land and Food Systems, Graduate Student Society, UBC Wellbeing through SEEDS Sustainability Program

D2. Blocked Infographic



PLANT-FORWARD EATING

Plant-based or plant-forward eating patterns focus on foods primarily from plants. This includes fruits and vegetables, nuts, seeds, oils, whole grains, legumes, and beans. It doesn't mean that you are vegetarian or vegan and never eat meat or dairy. Rather, you are proportionately choosing more of your foods from plant sources.

WHY



Combat climate change:

- Switching from a meat-based diet to a plant diet based reduces water, lowers pollution, slows deforestation and reduces destruction of topsoil.



Positive health outcomes:

- Nutritionally adequate with increased vitamins, minerals and dietary fibre
- Reduction in the risk of chronic diseases, such as type 2 diabetes, obesity, heart disease and certain cancers.



Cost benefits:

- Plant-based proteins can be less expensive in comparison to animal proteins
 - Reduction of chronic diseases leads to less stress on our Health Care system
-

HOW

SHOPPING PLANT-BASED ON A BUDGET

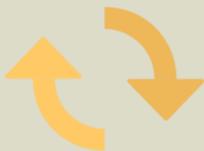


- Purchase items such as whole grains, dried beans & fruit, lentils, nuts and seeds in the bulk section
- Non-perishable items such as canned legumes, frozen fruit and vegetables and quinoa aid in reducing overall costs
- Base meals around beans, lentils, peas, chickpeas and soy.
- Check out local farmers market to purchase fresh and local produce that is in season



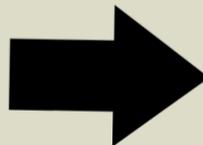
COOKING + PREPARATION TIPS

- Cook plant-based proteins in bulk and freeze/refrigerate for later use
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Plant-forwards swaps

Chicken
Ground meats
Eggs
Cheese



Tofu
Lentils or Beans
Peanut butter
Hummus

MEAL INSPIRATION

BREAKFAST IDEAS



**Overnight oats:
Soak oats with nut-
milk or water and top
with fruit!**

LUNCH IDEAS



**Quinoa veggie bowl with
a protein source**

**View link for a
detailed recipe:
<https://qr.go.page.link/1ZXZwL>**

DINNER IDEAS



**Lentil curry with
grain of your choice!**

**View link for a
detailed recipe:
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This is a student-led project in collaboration with Land and Food Systems, Graduate Student Society, UBC Wellbeing through SEEDS Sustainability Program