

UBC Social, Ecological Economic Development Studies (SEEDS) Student Reports

New SUB Rooftop Garden Report

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(UBC Food System Project)

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Abstract

In partnership with the University of British Columbia Alma Mater Society (UBC AMS), the students from the UBC Faculty of Land and Food Systems (LFS) conducted research under the umbrella of the UBC Food System Project (UBCFSP), operated through the LFS. On behalf of the AMS's initiative to design and manage the New SUB Project, we¹ investigated various rooftop designs and researched information for the management of a rooftop garden over an approximate area of 30,000 square feet (sf), keeping in sight the demands of students, stakeholders, and UBC's sustainability pledge. For the purposes of meeting the standards of the Sustainability Charter, we have neglected the specifics of costs (but made estimates) and made recommendations based upon long-term sustainability. We allocated 75% (~22,000 sf) of the rooftop for crop production using container gardening with a total of 6,500 sf for dedicated crop growth and the rest of the area for vital components such as a beehive, greenhouse, shed, compost and walkways. Crop space can be increased to up to 12,000 sf depending on the needs and resources available. The remaining 25% was designed for student lounge space, green walls and non-crop, extensive greenery.

The recommendations for future LFS 450 students is to continue exploring the possibilities listed in the business proposal and to continue improving the rooftop garden's productivity and sustainability potential. The key message for the New SUB Project stakeholders (AMS Food and Beverage (FBD) and UBC Sprouts) is to work together in partnership to achieve the maximum benefit from having a rooftop garden on UBC Point Grey Campus.

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Introduction

The impacts of climate change have raised issues on sustainable practices. As a leader and role model in the community, The University of British Columbia (UBC) has made it a mission to implement sustainable practices through innovative approaches on campus and in the community. The students of UBC reflect the same desire to be more sustainable and environmentally conscious. As a result, the Alma Mater Society (AMS) New Student Union Building (SUB) student surveys indicated their desire for a student-friendly rooftop garden. We conducted literature and on-site research on rooftop gardens and came up with a proposal which we feel meet the needs of all participants involved in the New SUB planning process. Our research addresses the recommendations of the stakeholders as we investigated suitable layout designs for the proposed rooftop garden. There were three main garden types that we discuss in detail in the business proposal. We then listed potential gardening methods and proposed our most relevant findings for consideration.

This report entails the methods, process, and sources that were reviewed to complete the business proposal and what recommendations we made to AMS for materializing the rooftop garden. Recommendations to future LFS students continuing research on the rooftop garden project were addressed as well. Lastly, the group's thoughts and reflections are also conveyed in this paper along with a discussion of crucial topics about our approach in accomplishing the business proposal.

Problem Definition

The world is becoming increasingly urbanized, with almost half the world's population living in cities. At current rates, this figure will increase to 65 percent by the year 2025 (FAO). Urbanization affects all the sectors of the food system. As the urban population increases, more food needs to be produced, processed, transported, and distributed to cities. The change of sectors in the food system contribute to environmental noise; air pollution; soil moisture reduction; intensification of carbon emission, strain in the cities' infrastructure, unplanned and congested residential areas, overexploitation of natural resources, loss of biodiversity which ultimately leads to an unsustainable environment.

Urban agriculture strategies can be viewed as a powerful tool to help cities rebuild green landscape and sustainable microcommunities associated with rapid urbanization. UBC has tried to enhance the campus' urban agricultural capacity through various initiatives, including support for campus garden initiatives such as the LSF Orchard Garden and the Hawthorn Place community garden on campus. In addition, UBC is taking an opportunity to facilitate the expansion of urban agriculture initiatives including the upcoming New SUB rooftop garden. The objective in the creation of the rooftop garden is to grow food locally, be a leader in sustainable practices, and integrate education within the community. As a result, we reduce the distance food travels and increase the production of nutritious food in the UBC community.

The scenario of designing the first rooftop garden at New SUB is not only associated with the UBC food system, but also with issues in the broader food system. Global awareness is growing around the importance of rooftop gardens. Many large and densely settled cities around the world such as New York City, Chicago and Montreal are incorporating rooftop and community gardens in their city planning and infrastructure in order to solve interrelated food system and environmental issues.

The Vision Statement Collaboratively Developed by the Project Partners

The 7 guiding principles were an important component in the focus of the business proposal. As we performed our research, these principles were often used to reassess our progress and used to ensure that we remained on task.

The 7 guiding principles developed by project partners:

- Food is locally grown, produced, and processed
- Waste must be recycled or composted locally
- Food is ethnically diverse, affordable, safe and nutritious
- Providers and educators promote awareness among consumers about cultivation, processing, ingredients and nutrition
- Food brings people together and enhances community
- Is produced by socially, ecologically conscious principles

- Providers and growers pay and receive fair prices

It was unanimous that the guiding principles represented the LFS curriculum well and it was believed that every guideline played an important role in the development of a sustainable rooftop garden. We all agreed that there was nothing that we would take away from the guidelines but due to the nature of this assignment being the development of a business proposal, we quickly learned our lack of experience in economics. As a result, we researched several existing green roof case studies and business proposals. Upon completion of the business proposal we agreed that there was a very important economic component in developing a sustainable rooftop garden. In order for a rooftop garden program to sustain it would be important for it to be economically manageable. Thus, we recommend that the guidelines should highlight the importance of economics and could promote social cooperation and responsibility to encourage volunteering that would reduce the economic burden of the rooftop garden.

We also found that our academic backgrounds affected the way we appraised the level of importance of certain principles. The group comprised of members from a Food and Nutrition, Food Science to Global Resource Systems background. We all have taken the whole series of LFS courses and we're at agreement of what these guidelines meant but when we were applying them to create the business proposal each group member differed in opinions in what they felt should be a priority. Some members felt strongly about emphasizing the production of locally grown foods, thus increasing designated crop space. While others felt that education and community were a priority, which would

emphasize the non productive (lounge) area of the rooftop garden.

Overall, the guiding principles played an essential role in the research process of our project. We also felt that a rooftop garden based on these guidelines would not only make a significant local but also an international impact. The rooftop garden would not only reduce the local carbon footprint but actually enhance global equity by reducing the amount of products imported.

Methodology

The method of approach for deriving the AMS New SUB business proposal was not a simple formulaic process, but it was an intricate adaptation of various methodologies combined. First, we began by apportioning elements of the report between two main groups (group 8 and our group). Within these distinct groups, smaller sub-groups were formed to collect data on distinct topics of the business proposal.

Our group's specific responsibilities were for the layout (eg. 3-D Google sketch blueprint), year-round production plan, management plan, resources needed, waste management, business plan, additional information (i.e. the appendixes and tables), and business proposal (i.e. compilation - which includes the introduction and recommendations).

We researched scientific and non-scientific literature pertaining to relevant

information on building or maintaining a rooftop garden. We reviewed student feedback, AMS Counsel's recommendations, and the UBC sustainable campus philosophy. We briefly interviewed the stakeholders and obtained insight from a short list of questions we had concerning the New SUB project. We looked at case studies in our assessment of rooftop garden budget estimates. Furthermore, we visited City Farmer's rooftop garden and SPEC (Society Promoting Environmental Conservation).

Findings

We were assigned with the task of writing a business proposal for a rooftop garden for the new SUB. There were many factors that had to be considered, for instance the expectations from the main stakeholders (AMS Food and Beverage Department (AMSFBD), AMS and New SUB designers), student and faculty opinions, effects on the surrounding community, and other groups of interests (i.e. Sprouts and UBC Farm). The business proposal is a set of guidelines and recommendations compiled by our group derived from research (mentioned in methodology).

Upon compilation of the final layout, we had tried to keep in consideration all of the stakeholders as well as all the possible users/beneficiaries (i.e. students and community). As a result, we decided to have 75% designated as an inaccessible, productive (crop growing) rooftop and the remaining 25% be an accessible lounge area that is still a green space but not for cultivation. After all the other garden features were taken into account (i.e. beehives, shed, greenhouse, compost, and walkways) there was

approximately 50% of the rooftop available for container gardening. As LFS students we had wanted to maximize on the crop space and reduce the lounge area but when we considered the management of the rooftop garden and the preference of UBC students, we decided to try and incorporate some of their requests. For example, we have included an extensive green area on the outdoor lounge that cannot produce crops but still provides all the benefits for a green rooftop.

In our business proposal, the current layout has approximately 6,500 sf of crop space but a crop space of 10,000-12,000 sf could be obtained with alterations of the layout. In management, we have proposed AMS to hire one full time gardener who would be able to manage the 6500 sf of crop space plus green lounge space and greenhouse. But if the rooftop garden had the capacity to produce and manage more, the crop space could be expanded. Thus, the selection of a container rooftop garden allows for flexibility to add more if resources are available. Container gardening was selected also for their ease in maintenance since the rooftop will be mainly volunteer oriented.

The design of the layout was aimed to inspire the possibilities, so some crop space was taken away to include more varieties of rooftop garden features. We hope that this could be the first phase of design where stakeholders would be able to review our proposal and pick and choose certain garden features.

(***Note: Please refer to the business proposal for details for the recommendations put forth in the Appendix)

Discussion

Over the course of the term we had various input to the present project and its future. The following is a summary of our main discussion points. While we did unify our voice for the final proposal there are some topics that are still highly malleable. The proposal sets the framework for future plans but it can still be changed if a solid argument is proposed with the help of the underlying currents expressed here.

Flexibility of garden use and increasing crop growth were important discussion points. Having plots for research use will help to define the garden as a ‘living laboratory’ thus making the garden a globally significant model of sustainability, therefore it is important to uphold this standard through promoting efficient and abundant crop production. Given the demand for local and organic produce, we asked ourselves: does 30,000 square feet for the garden allow for growth? Undoubtedly, many groups (such as UBC Food and Housing Services) may want to buy produce from AMS. Strong arguments for growth could result in more space allotted for crop production. For instance, other groups on campus may want to use the space if the rooftop garden is successful. More specifically, Friends of the Farm and UBC Veggies Club are two clubs that may want to increase their presence on the rooftop garden. Allowing for management and production flexibility could result in avoided conflicts.

Our group also discussed how to balance various stakeholder desires and needs. There is evidence for using the rooftop for non-production wants. To accommodate this,

we think that it would be possible to maximize the efficiency of the production space using strategies such as crop synergy and vertical gardening. Will Allen's Growing Power garden (Allen, 2008) is also a showcase garden for efficiency. Southlands Farm in Vancouver uses a production method perma-culture herb spiral that maximizes space (Allen, 2008). Visual engagement features (art) was also requested by the student survey. However, art and aesthetics can be integrated to be productive growing space as well. Others thought the increased efficiency and decrease in management required could reconcile the difference.

Fears of a "green-washed" roof (where it is not actually truly sustainable but just appears to be) were raised when our finished plan was visualized. We first set the lounge area as 25% and the production space 75%. Upon completion of our research and defining the layout components we found that nearly 25% of the production space would be needed for laneways, art aesthetics, storage, irrigation, greenhouse, and compost. The final plan only had 50% of the rooftop reserved for crop production. As previously mentioned, efficient use of space can alleviate this concern, and new plots can easily be added to extra space in the garden to increase crop production.

Finally, the rooftop garden team was formed by the merging of two separate groups and we decided upon a unified business proposal for the stakeholders and a separate report for the teaching team. This had its pros and cons and raised a lot of discussion. A benefit is that it reduced work for the stakeholders in evaluating the proposal. On the other hand, group management was difficult. This affected the

cohesiveness of the proposal and each group was not well informed on the research and recommendations of the other. However, continued effective communication could have improved our final proposal because ultimately we were not well familiarized with the details of the education and the distribution part of the proposal for the garden. When working collaboratively with another group communication and discussion is essential.

Summary Statement

As a group we were very enthusiastic about this project but it did prove to be a challenge. We found that applying the theory of sustainable farming involves an overwhelming number of considerations that requires an intense amount of research. Most of our time was put into this research, thus due to such time limitations; there remains research gaps in our project. As nutrition and GRS (Global Resource Systems) students we realized that we lack foundational knowledge in gardening and crops to thoroughly delve into the production plan of the project. Instead we put together a list of crops that the garden can grow based on the needs and desires of the stakeholders as well as the abilities of container gardening. We also provided resources for future reference to assist in the establishment of a crop schedule and crop synergy etc.. Developing an elaborate water management plan was also difficult to complete as we did not have specific data on the amount of rainfall on the roof as well as how much irrigation water the garden will need. Instead we simply provided information on, and recommended a couple of water management systems like grey water treatment, rainwater barrel storage and a drip irrigation system.

We found an abundant amount of information on rooftop gardening and it was difficult to sort through all of it to find relevant data. Because there was an excess of information it was challenging for us to set boundaries on the amount of detail we needed to include for certain aspects of the proposal. Due to time limitations we opted to cover as many aspects as possible but left some specific details for future development.

There were several stakeholders involved in the planning of the project. It was somewhat difficult to remain in contact with all of them and at the same time consider all their suggestions and needs in one proposal. The main disparity occurred in the suggested allocation of space to a lounge area and to crop production. But all suggestions were taken into account and with most of the rooftop garden being dedicated to crop production; a relatively flexible layout plan was produced to account for any future changes.

Overall, our team believes that a lively and sustainable rooftop garden is definitely feasible and can be created with the influence and support of our stakeholders, students and the community.

Specific Recommendations to Some Members of the UBC

Community

Many people have expressed an interest in using the rooftop garden. Our garden management proposal (refer to appendix) is informal at this point, but it is known that the AMS will govern the space. The option of creating a formal club for the garden was deemed unnecessary at this point by our stakeholders. The key stakeholders are Sprouts and AMS Food and Beverage Department (AMSFBD) as well as interested educational groups or personnel. We suggest a management framework that involves a volunteer coordinator and an AMSFBD gardener to co-manage the rooftop with the advice of the SUB Renewal's Professional Advisory Component (PAC).

If AMSFBD can afford an added staff member, likely the paid garden manager can expect part-time year round work. It could turn out that AMSFBD will pay the cost of production in return for selling its produce through AMS outlets and by selling to Sprouts². Start-up cost will be covered by the architectural budget³. However, the UBC Farm has stated that the amount of work is highly variable and difficult to quantify⁴.

However, we will try to quantify the workload. If we go with the suggested 75% of space allotted to crop space the amount of space needed for management is 22,500 square feet (1/2 an acre). The amount of time needed to cultivate this space is highly variable. An efficient use of space will likely require one part-time experienced gardener plus volunteers⁵. Depending on the types of crops, size of crop space, growing method,

² Management Meeting [Personal interview by Ben Amundson]. Interviewees Caitlin Dorward & Nancy Toogood. Sprouts and Alma Mater Society: Food and Beverage Department. (2010, Mar. 30).

³ Roof-Top Garden Meeting [Personal interview by Scenario Group 1]. Interviewees Guillaume Savard, Jensen Metchie, Liska Richer, Jim Leggott. New SUB Project Manager, AMS New SUB Project Coordinator, SEEDS program coordinator, Land and Building Services. (2010, Feb. 10).

⁴ Farm Management. [Personal interview by Ben Amundson]. Interviewee Gemma McNeil. UBC Farm Volunterr Coordinator. (2010, Apr. 4).

⁵ Growing Methods and Mangement [Personal interview by Ben Amundson]. Interviewee Scott Gambriell. Southland Farms. (2010,

number of volunteers and the volunteer's level of skill, and time of the year, this number will fluctuate. Once more specifics are determined it is recommended that the LFS Orchard garden, local Community Supported Agricultural projects and the UBC Farm are contacted for a further understanding of labor hours needed. The paid staff will act as co-manager with Sprouts.

Specifically, labor hours are described below. Maintenance is continual and can include various things. In the summer paid staff may work as many as 30 hours a week while working 10 hours in the winter. Most AMSFBD duties would include summer maintenance when students are away. Sprouts and Friends of the Farm have expressed interest in supporting the garden with volunteers. Sprouts volunteers may support fall harvest. Upon implementation, we've suggested that directed studies students can plan for the spring season. The paid labor hours are contingent upon many variables except AMSFBD plans on hiring a gardener².

The Sprouts plan on designating a volunteer coordinator². These will be semester-to-year-long positions that require a fair amount of responsibility for such a sensitive crop production area. They will be trusted individuals who will ensure the safety of the crops. Students at-large should not be able to gain access to the garden². Sprouts would be the main gateway through which volunteers access the garden.

The "what ifs" are important to consider when trying to reduce the risk of internal

Mar. 27).

conflict. Should another organization wish to directly partake in the decision-making process, the group can put forth a proposal through the AMS counsel². For example, should Food and Beverage have a problem with Sprouts they can file a complaint with the Counsel and vice versa. However, there should be a sense of ownership over the garden. It cannot be subject to the yearly whims of fickle political parties. Sprouts and AMS Beverage should be seen as the key collaborators and owners of the roof-top garden. Management conflicts will be dealt with through the AMS counsel.

To ensure that Sprouts participates in the planning process it is recommended that they request to join the Sustainability Advisory Committee (SAC) through the contact of Jensen, of the SUB Renewal Committee². The SAC will “be responsible for developing and administering overall sustainability objectives for the new SUB which will be derived from user input, functional requirements, and a generic strategic planning process⁶.” This requires that Sprouts pursue the position as soon as possible. Sprouts has contemplated the idea of having a rooftop garden liaison on their Board of Governors, who could sit on the SAC as well. The new Sprouts rooftop liaison would be required to attend bi-monthly meetings during the SUB Renewal Schematic Design phase, changing to once a month during Design Development⁶.

In terms of academic management, the SUB Renewal plan wishes to create a Professional Advisory Component (PAC)⁶. In order to manage the garden proficiently it is recommended that the Teaching Team helps create the PAC to advise Sustainability

⁶ Alma Mater Society. "New SUB Overview." *Sustainability Advisory Committee Terms of Reference*. SUB Renewal Committee. Web. 06 Apr. 2010. <http://www2.ams.ubc.ca/images/uploads/Sustainability_Advisory_committee_-_Terms_of_Reference.pdf>.

Advisory Committee. It has not yet been established and may require the collaboration of different faculties. Some professors and groups have already expressed interest in studying the roof-top. On a smaller scale plot level, we have three recommendations. That Riseman and Roehr work side-by-side while the Urban Aboriginal Community Kitchen Project works with student volunteers and Hanberg. Nemetz and Verammen can easily work through SEEDS in developing sustainability-based studies (see section 9.1.1 of appendix document). Forming a PAC based on academically interested parties will improve the managerial process.

The lounge space will be open to the public, include both indoor and outdoor seating and a community kitchen. Sprouts and AMSFBD have expressed interest creating a community garden feel¹. Workshops would be organized through AMS room bookings or through the garden manager. The responsibility for using the community kitchen could be dealt with in either fashion. For example, members of UNA could co-host an event with a UBC group. These workshops could be lead by Allan Garr or John Terezakis. The use of the non-food (and food) production space will be inclusive but organized.

Specific Recommendations for Future LFS 450 2010

Colleagues

As we mentioned, this is a large scale project and it was difficult to cover every aspect of the garden in detail in the proposal. Therefore, future groups can continue to fill in research gaps to continually enhance the garden. One area that needs more research is

the production plan as stated in our conclusion. Another area that needs further research and recommendations for is the management of rainwater on the rooftop. Since we do not currently have specific information on the rainfall collection of the New SUB roof and the exact amount of water needed from that for irrigation and other water usage purposes on the roof, it is important to confirm that the proposed rain water storage system is sustainable and if not, what changes need to be made.

With such an intensive project it was difficult to split it into manageable tasks among two groups and yet maintain a sense of cohesiveness between different sections of the proposal. We recommend that in the future, if group-merging does occur (ideally not), that emphasis is put on communication between groups and that frequent updates on the progress of each task is shared and discussed. Writing a report/proposal outline together as an entire team at the start is imperative to linking the entire paper together and avoiding overlap between sections. Even between members of a group doing different sections, this is a good idea too.

Another idea for future 450 students is that they can act as consultants to the stakeholders of the garden. Data collected about the growth of crops and general functioning of the garden can be given to the students for analysis and recommendations can be relayed back to the garden managers in order to continually improve and maintain the quality of the garden. Missing data can also be identified so that new methods of data collection can be set up by the students to allow for further analysis and improvement.

As the rooftop garden details are finalized close to the date of the completion of the New SUB, it is important to establish clear guidelines as to the management of the garden which may change from the recommendations in our proposal. This can be due to possible changes in crop production and maintenance needs, therefore future groups can re-propose a management plan with specifics like how many volunteer hours are needed by Sprouts for example, to keep the garden running. If Sprouts and the AMS informal management agreement does not work out (via AMS counsel) the future LFS 450 groups can also work to develop a management style similar to the LFS Orchard Garden.

Directed studies on the rooftop garden can also be set up for LFS 450 students. One suggestion is that an Eco-footprint Systems Analysis can be done on the roof-top garden under the supervision of William Rees and Peter Nemetz (both UBC sustainability-related professors). The garden can also be used for any CSL projects in any relevant LFS courses, possibly involving teaching students from elementary and secondary schools (as recommended in the business proposal) about the garden itself, gardening skills, the nutritional value and properties of fruits and vegetables and what it takes to create a meal from soil to plate.

As LFS 450 students, we truly appreciate this opportunity to take part in the creation of a productive green space for the New SUB. We hope that future LFS 450 groups will continue to build on this pilot project and that our vision will come to life.

References

Allen, W. (2008). Our Community Food Center. *Growing Power*. Retrieved on Apr 1, 2010 from: <http://www.growingpower.org/headquarters.htm>.