

Fresh Hill Behind
- designing activities for learning food -

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Abstract

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Abstract: Segregation of local food systems is becoming an issue to be discussed in the United States. Most people are only in touch with the retails and consumption parts of the whole food system. The disconnect with food production may lead to the loss of interest in fresh food. Sited on a hill behind Rainier Vista, Seattle, my thesis focuses on creating activities for recovering connections to local food systems. Participants and visitors are able to learn about eco-systems, seasonality, and diverse cultures through themed activities. That promotes the recovery of local food systems. The site proposed will be no longer just a hill. It will become a fresh hill that is connected to many local facilities, and that forms a large corridor of food infrastructure. The infrastructure will breakdown the segregation of local food system and foster a healthy relationship between people and the food they eat.

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Project Narrative

Background

Food is becoming an increasingly important topic in the face of issues such as food deserts, food safety, and food security. From the perspective of social equity, access to fresh food is one of the most serious problems to be solved in the contemporary society. Since fast food is more accessible than fresh food in terms of physical distance and time, people are likely to have better access to fast food, although the actual cost of having food is the same as fresh food. According to the Organisation for Economic Co-operation and Development (OECD)'s survey conducted in 2011, average time spent cooking food and cleanup is 58 minutes/day in the United States, which is the worst of any OECD country. Also, the USDA Year Book shows that the United States is dependent to a gigantic amount of food imported from other countries. All things considered, segregation of local food systems is becoming an important issue in the United States. Most people are only in touch with the retail and consumption parts of the whole food system. The disconnect with food production may lead to the loss of interest in fresh food. Therefore, reconnecting people with

food production is the main agenda of this project.

Site

The site analysis began with the city scale in Seattle, looking at potential land that could be cultivated, especially green open spaces and areas near steep slopes. By overlaying these locations with a density map of fast food restaurants, the area near Rainier Vista Housing is selected as a case study site. The site is embraced by a hill behind the housing structures and there are many fast food restaurants along the main arterial road. Yet, there are also some supermarkets, community farms, and a food bank, where local residents are able to obtain fresh food regardless of their income. They have access to fresh food if they take time to get fresh vegetables for free from the food bank. However, this area is still known for the high rate of diabetes. Diabetes is considered as a lifestyle disease, so presumably the lifestyle of the local residents is less healthy than people living in the other areas, and it is important to promote consumption and production of fresh food in this neighborhood.

Concept

So as to promote the desegregation of the local food system and foster healthy and fruitful lives, I would like to create a design that induces activities for learning about food. These include not only the place with programs to learn food production deliberately, but also places where people can engage in a variety of different physical, social, and recreational activities. Through cultivation of the underutilized hill, a wide range of activities such as seeding, harvesting, and cooking are generated.

Then, participants and visitors are able to learn about eco-systems, seasonality, and diverse cultures through the activities. These serve as significant parameters and outcomes of recovering local food systems.

Programs

In response to the concept, gradients of eco-systems, seasonality, and cultural diversity on the hill are considered from existing conditions. Also a trail and a series of retention ponds are planned according to slope angles and watershed. Each retention pond makes spaces for people to get together. After considering three types of gradients and approaches to spatial intervention, six different areas on the hill are designed: forage forest, forage garden, terraced rice field, orchard, herb garden, and community greenhouse.

Forage forest offers variety of forage for wild animals and poultries. The planting plan is related to wildlife species found in Seattle, and variety of plants including mushroom are to be set on the ground. Forage garden allows visitors to observe what and how wildlife makes their living from various angles. This garden is also intended to be a race of forage but vegetation is more organized compared to the forage forest. Terraced rice field is a cultural cultivated form that reminds visitors of what they live with the experience of seasonal transitions. Responding to the climate in Seattle, stormwater is stored during the winter and it is discharged into rice fields during the summer. Orchard gives visitors plenty of fresh product on seasonal basis. Maintenance such as pruning is conducted as after school activities by Boys and

Girls Club of America. Herb garden gives visitors an opportunity to interact with various types of herbs that are connected to cultural food. It is also designed as a rain garden, thus it does not need high-maintenance. Community greenhouse functions not only as a literal greenhouse to grow plants, but also as a meeting place for local residents. In October, local residents can hold a harvest festival, bringing fresh vegetables and fruit harvested on the hill.

Future trajectory

Fresh hill behind will no longer be just a hill. Following initial cultivation, the Fresh Hill Behind can expand to a larger scale. Educational institutions would be invited to join with the project to provide opportunities for students to learn more about local food systems and engage in cultivation and maintenance. Fresh Hill Behind could also be connected to many local facilities and organizations engaging more stakeholders and community members. The design process can be applied to other hills in the city, allowing them to connect with each other, and creating a large corridor of urban food infrastructure. The infrastructure will contribute to the desegregation of the local food system and foster a healthier relationship between people and the food they eat.





Fig. 0-1. Existing aerial view of the proposed site

Source: Google Earth

1. Introduction

1.1. Background

Food is becoming increasingly one of the most important topics among social issues such as food dessert, food safety, and food security. From the perspective of social equity, access to fresh food is one of the most serious problems to be solved in contemporary society. Since fast food is more accessible than fresh food in terms of physical distance and time, people are likely to have better access to fast food. As figure 1-1 illustrates, average revenue of McDonalds, which is one of the largest fast food chains, is still growing. However, the actual cost of having McDonalds is the same as fresh food. According to the OECD's survey conducted in 2011, average time spent cooking food and cleanup is 58 minutes/day in the United States, which is the shortest of any other OCED countries¹ (Fig. 1-2). This promotes that people in the United States rely on fast food to save time for cooking and cleaning up.

Also, the USDA Year Book shows that the United States is dependent to gigantic amount of food from other countries according to the result of U.S. food imports, estimated value by country² (Fig. 1-4). Moreover, comparison of import value by share of consumption derived from imports shows that every vegetable and fruit was imported more in 2013 than in 1980 (Fig. 1-3). These facts mean that import is necessary for the United States to provide food for citizens.

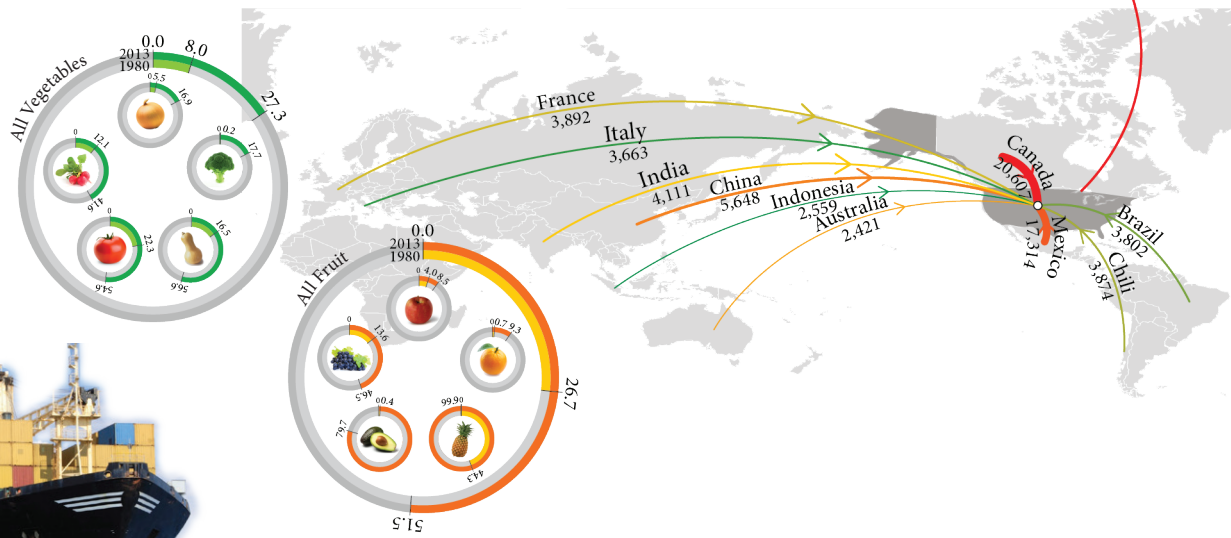
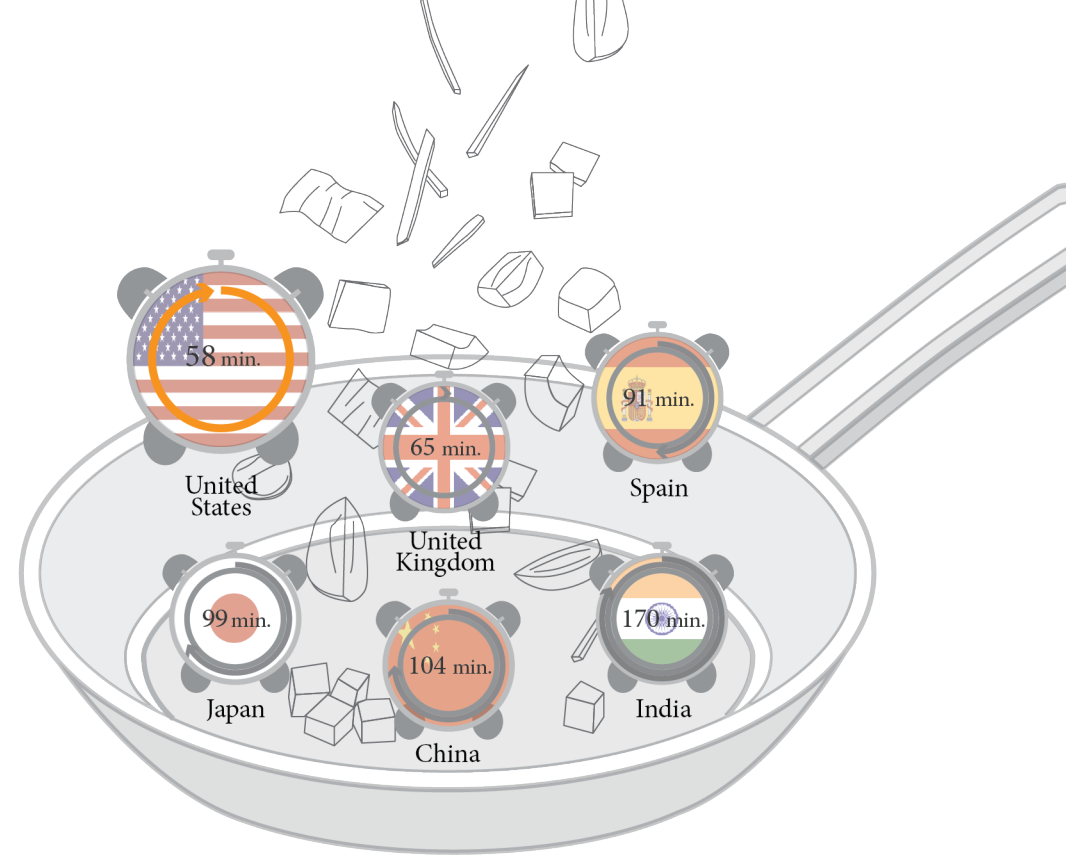
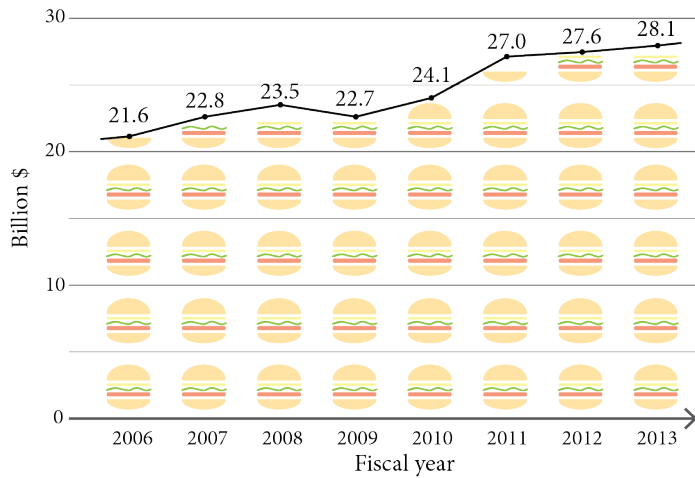
Accessing food for everyone could be feasible, because poor people receive food subsidies from the government in the United States, called food stamps. Since food stamps are issued for the poor, poverty would no longer be happened in the United States. However, food stamp just gives budget for food, and does not consider whether people obtain healthy food or not. According to Gibson (2003) discussing the effect of food stamps, obesity rates positively relate to the food stamp program³. This suggests that the poor might have access to healthy food.

However these days, there are several discussions and trials to implement edible gardens so that local people are able to access healthy food. With the development of cities, designing such gardens is in a fashion because this promotes health for local residents.

¹ Organisation for Economic Co-operation and Development. (2011). Society at a glance 2011: OECD social indicators. Paris: OECD.

² United States Department of Agriculture. (2014) USDA Year Book, <http://www.ers.usda.gov/data-products/us-food-imports.aspx>, cited 11 June, 2015

³ Gibson, D. (2003). Food stamp program participation is positively related to obesity in low income women. *The Journal of nutrition*, 133(7), 2225-2231.



Upper Left: Fig. 1-1. Transition of Average Revenues of McDonalds
 Upper Right: Fig. 1-2. Average Min./day on Cooking Food and Food Clean-up
 Bottom Left: Fig. 1-3. Share of consumption derived from imports
 Bottom Right: Fig.1-4. U.S. food imports, estimated value by country (Million dollar)

Source:
<http://secretmenus.com/7-mind-blowing-facts-mcdonalds/>
 Society at a Glance 2011: OECD Social Indicators - © OECD 2011
 USDA Yearbook (2014)

In summary, the issues of how to obtain fresh food can be concluded to the ways of how to spend time for food and recognize the segregation of local food systems. Some scholars and practitioners are anxious about the segregation of local food systems. According to Environment and Food by Colin Sage, "... since the rise of the modern agri-food system after 1945, there has been a relentless squeezing of the public into the category of 'consumers'⁴." (Sage, 2011, p.6) The consumers cared more about the price and convenience of food. They ignored the quality such as nutritional value, production methods, and traceability. Figure 1-5 shows an existing local food system. Assumably Most people are only in touch with the retailing and consumption parts of the whole food system. The disconnect with food production may lead to the loss of interest in fresh food. Therefore, reconnecting people with food production is the main agenda of this project.

⁴ Sage, C. (2011). Environment and food. London: Routledge.

⁵ Beacon Food Forest in Seattle, <http://www.beaconfoodforest.org/>, cited 29 May 2015

1.2. Purpose of Design

So as to promote the desegregation of the local food system and foster healthy and fruitful lives, I would like to create activities that draw people for learning about food. In terms of food education, I would like to share both food and knowledge. The activities include not only places with programs to learn food production deliberately, but also places where people can engage in a variety of different physical, social, and recreational activities. As a result, I expect this idea will promote the desegregation of food system and everyday life in urban settings. To take an example of the eating part of the food system, local residents can teach what to eat and how to cook fresh food to each other, so that they can realize another method to stay healthier rather than just obtaining cheap and unhealthy food. There is a precedent⁵ that provides fresh vegetables for the visitors, which I will explain in chapter 2. It gives me fresh insight on edible gardens, but even the precedent does not provide a package of learning the local food system. To promote the desegregation of local food systems, my proposal provides learning programs that emphasize the local food system. I propose places where residents can obtain fresh vegetables and fruit and be encouraged to learn about aspects of the local food system such as seeding, harvesting, and cooking.

1.3. Anticipated Outcome

There are three anticipated outcomes. First, local residents are able to obtain a wide range of knowledge about food. Food is a medium through which residents learn about eco-system, seasonality, and culture. Designing places that give them knowledge of these themes enhances the food system. Second, local residents are able to learn what is fresh food and spend more time cooking healthy food. Presumably, food-learning opportunities have positive effects on eating habits. Residents will choose healthy food over fast food. Third, the place proposed contributes to community building. I suppose that people who live nearby my proposal site are involved in food education, so that the proposed site generates the interaction among people regardless of social status.

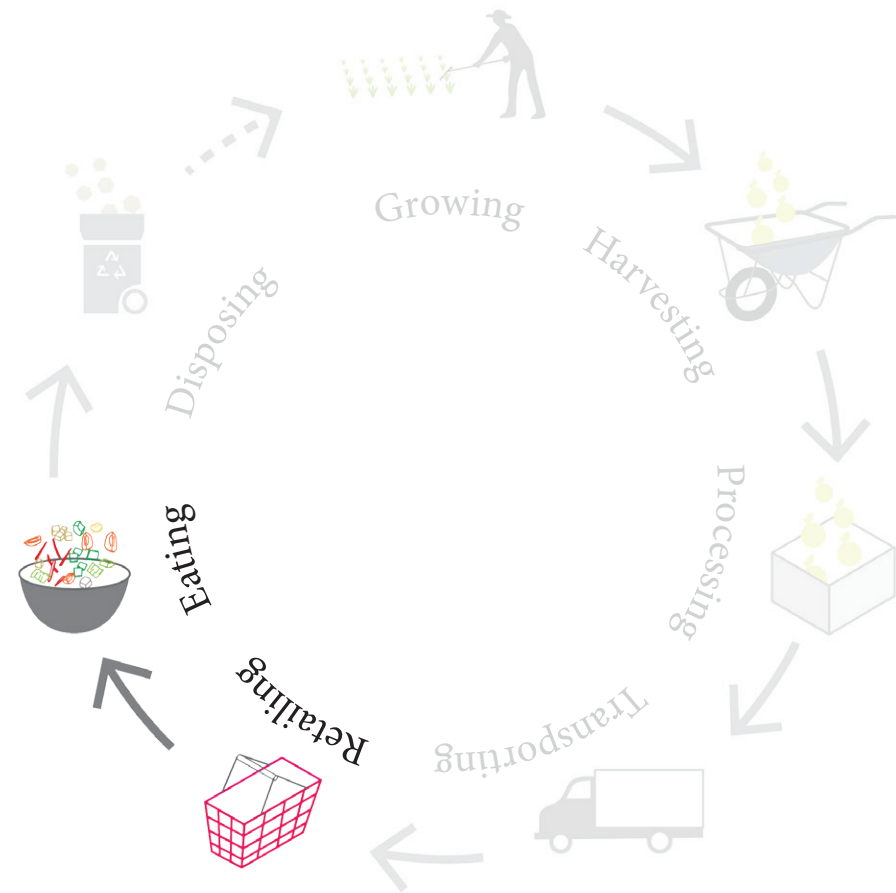


Fig. 1-5. Segregation of local food systems

2. Current situation for Food Learning and Precedents

⁶ Hamm, M., & Bellows, A. (January 01, 2003). Community Food Security and Nutrition Educators. *Journal of Nutrition Education and Behavior*, 35, 1, 37-43.

⁷ Winne M, Joseph H, Fisher A. *Community Food Security: A Guide to Concept, Design, and Implementation*. Venice, Calif: Community Food Security Coalition; 2000.

The literature review is divided into three parts: ideas on edible gardens, edible gardens as a place for learning about food, and ideas for living and learning with nature. Ideas on edible gardens clarify how the idea of food security has been developed. I discuss how people learn what to eat in the next chapter. Implicit food learning function will be discussed in the following chapter. The potentials and issues of current situation of food learning systems are discussed.

2.1. Ideas on Edible Gardens

Community Food Security

Although nearly 50 million people are not able to access good quality food in the United States, there is little concern about it. Recently, there is an idea called “Community Food Security (CFS).” According to Michael Hamm, it is defined as “a situation in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice⁶.” (Hamm & Bellows, 2003, p.37) Function of CFS is to bring back food production to the community so that all community members are able to obtain enough nutritious food through safe and culturally acceptable ways. CFS projects are distinct in that they pay attention to community infrastructure and leverage their local food systems to achieve food security.

Winne et al. mentions an organizational development tool in their report, “Community Food Security: A Guide to Concept, Design, and Implementation” with the goal of introducing CFS as a concept, an analytical tool and methodology, and a national policy goal⁷. They also summarize differences between CFS activities and traditional anti-hunger work. CFS is more about community development than social

welfare of anti-hunger work. CFS projects are longer term, while anti-hunger work is shorter term. The main actors of CFS are community organizations and multi-sector partnerships that support local agriculture with fair prices for farmers. On the other hand, social services agencies and charitable institutions join anti-hunger work, and they aim at commodities with cheap price. In consequence, CFS pursued larger and longer plans with community members.

Some CFS projects make use of community gardens. Duncan Street Miracle Garden (DSMG) in Baltimore, Maryland, engages gardeners and the community with food systems in Baltimore and this contributes to improved food security⁸. DSMG is a community garden, and the Parks and People Foundation supports the site. Around this garden, the neighborhood is 98% African American and experiences high rates of poverty. Currently, there are 11 gardeners who tend 17 plots. Surplus food from the garden is donated to various organizations in the neighborhood, including two local churches that manage soup kitchens, in addition to families and individuals. DSMG contribute significantly to the neighborhood in terms of healthy food supply.

DSMG proves to be a successful model in a low-income and predominately African American community. This is because a constant supply of

fresh fruit and vegetables enhances the gardeners' food security. The garden has become a place where community members are willing to come to eat fresh produce. In most cases, multiple CFS activities are effective and necessary to acquire diversity in the community. For instance, in the school meal program, an immigrant community might emphasize culturally appropriate food so that children are able to eat more than ordinary food. Then, school officials can define objectives in terms of balanced food groups and caloric levels to meet United States Department of Agriculture (USDA) approval.

The lessons of the DSMG should be recognized among other cities that hope to develop successful community gardens. This is the leadership demonstrated by the community. In case of DSMG, Lewis Sharpe, who is a core community member in the neighborhood, was dedicated to cleaning up the vacant space and committed to the garden. He also had an experience of gardening before, and helped community members produce vegetables and fruit appropriately. Another important element of the DSMG's success is pieces of support received from the city and community organizations. The city of Baltimore has several organizations, such as PPF and HEBCAC, designed to help Baltimorean communities start gardens. With the aid of such organizations, promoting community gardens is easier and the system connects people who are

⁸ Corrigan, M. P., & Local Food Systems and the Applied Geography of Food. (October 01, 2011). Growing what you eat: Developing community gardens in Baltimore, Maryland. *Applied Geography*, 31, 4, 1232-1241.

related to food education and edible garden sectors.

However, people who are involved in CFS struggle it, because the community includes too diverse and conflicting. People in the community need to identify a common purpose. Lezberg describes this need as “framing”. It must achieve three ends: diagnostic, that is, problem identification; prognostic, that is, proposing strategies for solution; and motivational, that is, directing action on problems⁹.

Continuous Productive Urban Landscape (CPUL)

In addition to the idea on food security, I also have to consider spatial strategy: how and where edible gardens should be implemented. With regard to the structure of edible city, there are some ideas on how to achieve it. In the 1990's, there were more and more discussions of the need to visualize edible cities. First, researchers focused on urban infrastructure as a medium of the productive landscape¹⁰. Second, some advocates became interested in reducing the environmental impact of cities because research had shown that increasing economic growth deteriorates human environment¹¹. Third, public open space was focused more as a contextual and lifestyle component for realizing sustainable cities¹². Katrin Bohn, who is an architect, urbanist, and lecturer at University of Brighton, argues for “Continuous Productive Urban Landscape (CPUL)”, which is a design concept

advocating the coherent introduction of interlinked productive landscapes into cities as an essential element of sustainable urban infrastructure¹³. CPUL city not only supplies local residents with vegetables and fruit, but also enhances social, environmental, and economic performance by practicing community farmlands.

There are three environmental benefits for realizing the urban food system as a part of CPUL: preserving bio-diversity, closing material and waste cycles, and reducing the amount of energy used to produce and distribute food¹⁴. Increasing farmland areas helps wild animals, plants, and insects survive in the harsh urban environment. Such farmland areas also could be connected each other so that they enlarge a potential living area of the wildlife. The urban food system also reduces surface runoff. Since farmland is unpaved, precipitation directly percolates through the soil preventing from flooding. Farmland apparently supplies food such as vegetables and fruit, thus it could support food on their own.

CPUL also has a possibility to change people's behavior. Not only it ameliorates physical conditions in a city, but also it affects social aspects. Urban agriculture of United States, for instance, is regarded as organizational forms including urban farms, community gardens or allotments and people who are involved in urban agriculture and concentrate on the

⁹ Corrigan, M. P., & Local Food Systems and the Applied Geography of Food., Ibid

¹⁰ Allen, S. 'Infrastructural Urbanism, Performance Notations: Barcelona ZAL,' Scroope 9, (1996): 71-79

¹¹ Mathis Wackernagel, and William Rees, Our Ecological Footprint: Reducing Human Impact on the Earth, (Canada: New Society Publishers, 1996).

¹² Makoto Yokohari, Process Architecture 127: Ecological Landscape Planning, (Tokyo, Japan: Process Architecture Co, 1995).

social impact of food producing spaces. Thus, urban agriculture is effective method to get well with each other within community members. Furthermore, allotments for farmland enable tenants of surpassing the recommended 30 minutes/day of daily activity. Allotment tenants also start eating more fruit and vegetables than used to be, once they grow food at the allotment. This increase also contributes promotion of purchasing fruits and vegetables through the year.

So far, strategic and infrastructural ways of how CPUL are initiated are looked through. However, further research to be addressed is how a significant amount of urban agriculture can be re/integrated into cities. For the solutions, Germany adds the intercultural garden movement to the richness of food growing projects and Britain is home to the first “food growing towns”. Both countries comprise cities where also larger scale urban farming initiatives are happening because of availability of space and strong stakeholder support. Another problem is how to collaborate with other disciplines. Since realization of CPUL requires a broad range of knowledge, urban design and planning, landscape architecture, horticultural and retail professions will need to regain old skills and develop new ones. Among them, our task as a landscape architect is to rethink and redesign better spaces for urban food systems.

¹³ Bohn, K., & Viljoen, A. (2011). The edible city: Envisioning the continuous productive urban landscape (CPUL). *FIELD*, 4(1), 149-161.

¹⁴ Bohn, K., & Viljoen, A., Ibid

2.2. Edible Gardens as a Place for Learning Food

Since some people actually may not know what healthy food is, encouraging them to learn about healthy food is important. Several projects attempt to conduct food education for local communities.

In Seattle, Beacon Food Forest could be considered as an example of edible garden. This project is located in Beacon Hill, Seattle, and the goal of Beacon Food Forest is “to design, plant and grow an edible urban forest garden that inspires our community to gather together, grow our own food and rehabilitate our local ecosystem¹⁵.” According to the website explaining Beacon Hill Food Forest, a food forest is

“a gardening technique or land management system, which mimics a woodland ecosystem by substituting edible trees, shrubs, perennials and annuals¹⁶.” Thus, different from typical community gardens, Beacon Hill Food Forest has multilayered trees, shrubs, and edible perennials with various height, so visitors to the forest can pick up a broad range of fruit, nuts, and vegetables. Furthermore, this forest is deeply attached to adjacent communities. Beacon Food Forest brings a richly diverse community together by fostering the idea of Permaculture, which is an approach to designing human settlements and perennial agricultural systems that uses the analogy of natural ecologies.

Beacon Food Forest has an edible arboretum with fruits gathered from regions around the world. There

¹⁵ Beacon Food Forest Permaculture Project, <http://www.beaconfoodforest.org/>, cited 29 May 2015

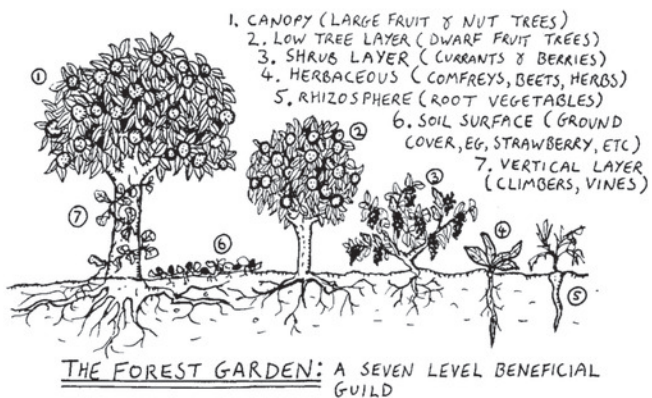
¹⁶ Beacon Food Forest Permaculture Project, Ibid.



Fig. 2-1. Beacon Food Forest plan
Source:
Beacon Food Forest Permaculture Project,
<http://www.beaconfoodforest.org/>

is a berry patch for canning, gleaning and picking, a nut grove with trees providing shade and sustenance, and a community garden using the p-patch model for families to grow their own food in the Food Forest. It also provides a gathering place for celebration and education, a kid's area for education and play, and a living gateway to connect and serve as portals as you meander through the forest. Through those places, the Food Forest provides local food and ties adjacent communities together.

Beacon Food Forest offers several classes on permaculture for local residents. Jacqueline Cramer, who is a co-director of Beacon Food Forest, teaches one of the classes, which is for people to implement the idea of permaculture to their own garden. In addition, she collects volunteers to help maintain the forest. I think this would be the good opportunity for people to get in touch with nature.



Seattle Tilth is an organization that promotes the public about organic food and edible gardens. According to their website, the mission of the organization is “The mission of Seattle Tilth is to inspire and educate people to safeguard our natural resources while building an equitable and sustainable local food system¹⁷.” They offer classes concerning gardening and food education for both adults and children. An array of adult classes focus on gaining skills such as how to grow vegetables, foster livestock, and cook fresh foods. Students learn about practical skills and sometimes about recent hot topics such as sustainable landscapes. On the other hand, classes for children improve their environmental literacy. For instance, summer garden and farm camps, a mobile garden classroom, and family Saturday’s programs are offered. These give children an opportunity to feel and experience nature directly.

Food safety education is also important for people who are interested in fresh food because it prevents them from diseases and obesity. The five major control factors for pathogens are personal hygiene, adequate cooking, avoiding cross-contamination, keeping food at safe temperatures, and avoiding foods from unsafe sources. Lydia Medeiros and her colleagues recommend that consumer food safety educators primarily focus on hand washing, adequate cooking, and avoiding cross-contamination¹⁸. Then, people should pay attention to keeping food at safe

¹⁷ Seattle Youth Garden Works – Seattle Tilth, <http://www.seattletilth.org>, cited 29 May 2015

¹⁸ Medeiros, L. C., Hillers, V. N., Kendall, P. A., & Mason, A. (2001). Food safety education: what should we be teaching to consumers?. *Journal of Nutrition Education*, 33(2), 108-113.

Fig. 2-2. Idea of permaculture
 Source:
 Beacon Food Forest Permaculture Project,
<http://www.beaconfoodforest.org/>

temperatures and avoiding food from unsafe sources. Evaluation tools are needed to evaluate self-reported behavior changes. The evaluation questions must focus on salient behaviors that are most likely to result in foodborne illnesses and must withstand strict standards of reliability and validity.

In Berkeley, California, a grassroots school-and-community effort has been transformed into a bioregional initiative. At first, a vegetable garden at the Martin Luther King Middle School was attempted in the schoolyard. The idea to have a garden spread to every schoolyard in Berkeley. Finally, the idea of a garden on schoolyard was shared among every school in California. Since a garden cannot produce enough vegetables and fruits for children in a school, they tried to create connections between local farmers and the school district. Instead of freeze-dried food trucked in from the Midwest, they tried to cook school food such as burritos with organic beans and cheese grown and produced by area farmers who are connected well to the neighborhood. This idea has led to the creation of the Food Systems Project. The aim is to have all the food in the Berkeley school lunch program be organic and locally grown within the next decade. At the same time, food preparation and agriculture education become an integral part of each school's curriculum. The Food Systems Project is funded by the United States Department of Agriculture's Linking Farms to Schools initiative,

the California Department of Health, and the Center for Eco-literacy, a broad alignment of funders trying to address the problems of child nutrition, school improvement, and sustainable agriculture in an integrated fashion¹⁹.

All in all, a local food system should be attached to the place where local residents live. Within the place, children should experience what is food, where it comes from, how it should be eaten. Comenius, the seventeenth-century education philosopher, articulated one of the core precepts of place-based education when he said, "Knowledge of the nearest things should be acquired first, then that of those farther and farther off²⁰." (Woodhouse, 2001) Children can learn most about the ecological system such as food chain, when they scrutinize the internal micro-environment of the neighborhood they live in as a focal point for the curriculum. The mosquito-breeding ponds in backyards and shopping areas are similarly appropriate contexts for learning.

¹⁹ Sobel, D. (2004). Place-based education: Connecting classroom and community. *Nature and Listening*, 4.

²⁰ Woodhouse, J. (2001). "Over the River and Through the 'Hood': Re-viewing 'Place' as a Focus of Pedagogy." *Thresholds in Education*, 27 (3 & 4), 1-5.

2.3. Ideas for Living and Learning with Nature

Building upon the idea of learning about food systems, I would say we live with nature and learn with nature. From the natural environment, we can learn a lot about ecological system, seasonality, and culture.

“Satoyama (里山)” is a Japanese term applied to the border area between mountain foothills and arable flat land. Satoyama are a great space for people to both produce and learn about food. “Sato (里)” means arable and livable land, and “yama (山)” means hill. Satoyama have been developed through centuries of small scale agricultural and forestry use. According to Takeuchi (2001)²¹, Satoyama includes a defined nature because the hill has been developed as a place of producing food and fuel. The word “Satoyama”

has appeared naturally among local communities. However, in the 1960s’, people in Japan started developing the Satoyama as residential areas. After that, some locals become worry of residential development, and started maintaining forest and rice field in Satoyama voluntarily. Today, there are remnants of Satoyama remaining between natural and urban areas in Japan.

Satoyama landuse consists of several typologies. Yamamoto (2001) argues that secondary forest, grassland, farmland, and settlements are attached together and to make a continuum of Satoyama units²². Figure 2-3 shows a rough zoning of Satoyama and other areas. Satoyama is defined as an area in-between natural forest and urban area. In Satoyama, the land use was divided according to landform. In the lowland area, there are settlements and rice field, and sometimes river flow through the lowland.

²¹ Takeuchi, K., Washitani, I., & Tsunekawa, A. (2001). *Satoyama no kankyogaku*. Tokyo: Tokyo Daigaku Shuppankai.

²² Yamamoto, S. (2001). *A study on transition of the structure of landscape and vegetation in Satoyama*, Report of National Institute for Agro-environment sciences(20). pp.1-105

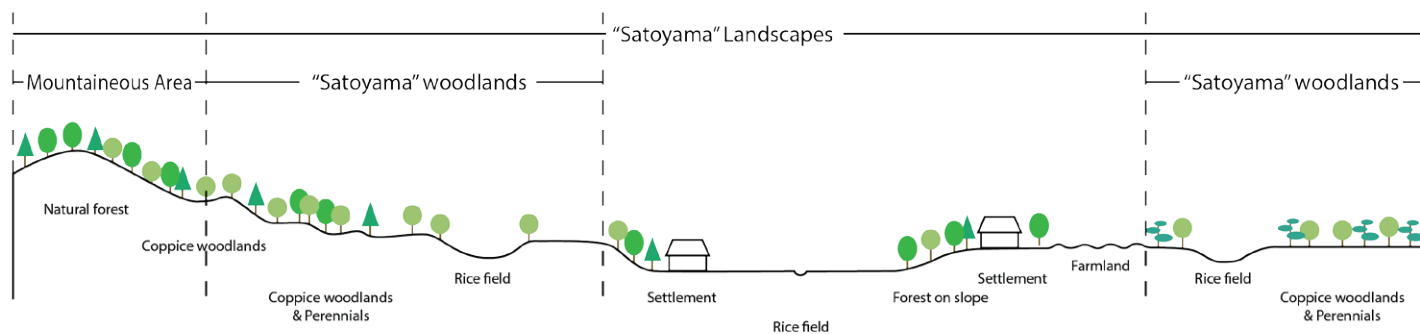


Fig. 2-3. Section of land use illustrating Satoyama landscape
Source: Takeuchi (2001, p.3)

At the edge of the lowland area, there is a forest on the slope area. Then, you can see coppice and grassland on the hilly area. The area is important for growing trees and sometimes crops, thus local people developed this area as much as possible. If the slope angle is too steep, the area becomes nature forest, where local people usually do not intervene.

Satoyama was deeply attached to local people's lives. People went into the Satoyama woodland to find wood and charcoal, and to maintain rice fields and farmland. They came across various types of animals, insects, and plants. That changed according

to seasonal transition, emerging living things changed. Their occupation was usually farming, and they cooperated with each other on agricultural works. They also celebrated the harvest season, and built cultural habits together. Satoyama landscapes illustrate how and what people learn from the food system, and how they can establish close connections to them.



Fig. 2-4. Typical image of Satoyama in Inage, Chiba, Japan

Source: http://commons.wikimedia.org/wiki/File:Inagi_satoyama_06b5841s.jpg#/media/File:Inagi_satoyama_06b5841s.jpg

In the United States, The Whole Systems Design aims at a sustainable future using the idea of permaculture²³. Their involvement is producing various types of food such as vegetables, fruit, mushroom, and rice. One of the main philosophies they have is anxiety about the distortion of consumer society. They say, “A few generations of accumulating instability from the system’s sheer scale and depth of injustice will ... overwhelm the system’s capacity to contain its own fallout.” (Falk, 2013, pp.18-19)

By taking care of farms and homesteads, they aim to changing people behavior to get away from a consumer society and to promote cultural revival that replaces consumers with producers.

Looking at their projects in a detail, they take advantage of natural conditions such as sloping and stormwater wisely. For example, they irrigate their rice fields by gravity. The total rice yield possible is

roughly 125 lbs. The basins of rice paddy also function as detention ponds, when they have thunderstorms. Nuts, fruit, and fuel-wood trees are planted along with rice fields, so at the time of storm events, they can store nutrients on the soil. According to The Resilient Farm and Homestead project, growing wet rice does require the development of significant infrastructure.

They try to grow various types of vegetables. However they put more effort into reliable crops such as potato, winter, squash, garlic, and carrot-radish-turnip. Types of vegetables could be separated into three categories: staple, nutrient, and fun crops. Staple crops are, more reliable, high calorie, and storable. Nutrient crops such as kale, cilantro, and chard are nutrient dense, storable. Ducks eggs and sheep milk are not vegetables, but are regarded as kinds of nutrient crops. Hot pepper, dill, melons, and

²³ Falk, B. (2013). The resilient farm and homestead: An innovative permaculture and whole systems design approach. White River Junction, Vt: Chelsea Green Pub.



Left: Fig. 2-5. Whole Systems Research Farm at Mad River Valley, VT

Right: Fig. 2-6. Rice field designed by Whole Systems Design

Source: <http://www.wholesystemsdesign.com/projects/whole-systems-research-farm-mad-river-valley-vt/>

tomato are categorized as fun crops that improve the function of dishes. Because of the diversity of the crops, harvesting seasons varies most of them are harvested in autumn. Carefully looking at the seasonal change, they decide when to harvest the crops.

They also grow fungi such as shiitake, which is one the most reliable products among mushrooms. Sugar maple is regarded as wood material that serves as a foundation in Vermont State. Also they found Red Oak, which is one of the most common deciduous trees in Seattle, to be a preferred wood material in the United States. By considering such combination, we could extend the idea of growing food, beyond just growing plants to foster whole eco-systems.

2.4. Conclusion

In the literature review and precedents above, we looked through three types of topics; ideas on edible gardens, edible gardens as a place for learning food, and ideas for living and learning with nature. During the section on edible gardens, Community Food Security (CFS) and Continuous Productive Urban Landscape (CPUL) as a medium of keeping in touch of food systems are discussed. Food education for children and approaches to learning about food systems was discussed at the chapter of food education. The last chapter clarified how people have lived by taking advantage of nature. As a result, followings are clarified.

CFS promotes safe, culturally acceptable, and nutritionally adequate and social just food systems. This idea is similar to what I would like to realize in this thesis. There are examples dealing with CFS, which help me a lot. They show that the strong leadership of a community leader is needed to implement CFS and that support from city and community organization helps move projects forward.

With urban redevelopment, CPUL is easier to realize than before. It not only provides food for community, it also offers environmentally sound places. It preserves bio-diversity, recovers material

and waste cycles, and reduces the amount of energy used to produce and distribute food. CPUL also helps promote people's behavior such as walking in and working on farmland. However, the reintegration of a significant amount of urban agriculture into cities remains a challenge. It is possible if plenty of space is available and with the support of strong stakeholders. However it becomes more difficult in an urban settings. Creating such spaces in Seattle will be discussed.

Food education is sometimes related to place-based education. In Seattle, there are substantial numbers of organizations trying to teach people how to grow vegetables, how to cook food, and about nutritional food. For instance, Beacon Food Forest offers classes on permaculture, and Seattle Tilth teaches various types of classes to enhance knowledge of food. They also plan more enjoyable activities rather than purposeful classes. Such fun activities include summer garden and farm camps, and mobile garden classrooms that encourage local people to become more interested in food.

The Berkeley's project focuses on educating children about community food systems outside. This education also fosters eco-literacy, which will become increasingly important as we have to deal with environmental issues all over the world. Food safety education is not fully connected to CFS, but it

is worth reviewing. It shows how to prevent people from diseases. Food safety could be promoted at community kitchens and exercise facilities.

Even without classes on food, we could learn a lot from nature, including cultivated nature. Satoyamas provide a great deal of information on food systems. They demonstrate how vegetables, fruit, and rice are grown according to natural conditions. Satoyamas were attached to local people's lives and created a complex natural and cultural space. Regular round trips to Satoyama enabled people to feel the seasonal transitions and to understand interrelation among insects, herbivorous, and carnivore animals. They created a place to be in touch with food systems.

In the United States, Whole Systems Design informs my ideas. They try to create places for variety of crops, vegetables, and fruit. They are anxious about the current consumer society and focus on the idea of permaculture. Participants are able to learn how the local food system is interconnected and how to produce rather than just buy food. The approach of Whole Systems Design illustrates the feasibility of implementing gardens that promote the idea of connecting segmented parts of the local food system.

My thesis involves many natural, social, and economic issues and focus on recovering a whole food systems. Drawing upon the literature review and precedents,

it focuses on designing activities and places that help people learn about food. Those activities relate to a part or parts of a local food system. Also, those activities are categorized in sub-themes: eco-system, seasonality, and culture. The sub-themes offer us implicit understanding of nature. They will mitigate the segregation of urban and natural spaces as well as the local food system as an outcome of recovering a local food system.

3. Site Analysis

3.1. Current Food Landscape in Seattle

Food landscape in large-scaled contexts

My idea, site analysis starts at a city scale. The topography of the city of Seattle was formed by glacial erosion, and steep slopes are common. Steep slopes are dispersed along the coast and the inland area in a longitudinal direction. Since the land in Seattle is fully developed, large areas are not available for farming. However, the land on the steep slopes remains undeveloped because of the difficulty of the development. The location of green open spaces that I extracted from Google earth²⁴(Fig. 3-1) corresponds to steep slopes in the Washington State Geospatial Data Archive²⁵(Fig. 3-2). I presume that cultivating a strip of a steep slope would be feasible.

As a next step, I explored the density of fast food restaurants. The prevalence of fast food in an area is helpful in identifying locations where a local food system does not work well. Hurvitz, et. al.

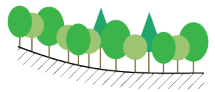
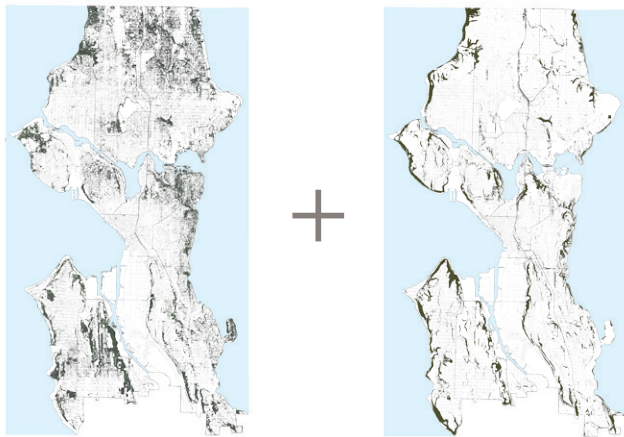
conducted a research to survey how arterial roads and area socioeconomic status are related to fast food restaurant density in King County, WA²⁶ (Fig. 3-3). During the research, they calculated the location of the density of fast food restaurants in King County. According to their conclusions, although there is no interrelation between census tract minority status and fast food density, the density is linked to low household incomes. Furthermore, locations of fast food restaurants are affected by higher traffic areas. Thus, I concluded that an area with low-income households and a high traffic would be an appropriate choice as a study site.

These things considered (Fig. 3-4), I determined the neighborhood around Rainier Vista Housing would be the best site to pursue my thesis topic. Rainier Vista Housing was previously publicly owned. After their HOPE VI redevelopment, they became mixed-income housing²⁷. However, the average household income is \$24,857, much lower than average household income of Seattle's \$60,843²⁸. The characteristics of the area are highly culturally mixed. In Seattle, the rate of white, black, Asian, and other races is 69.5, 7.9, 13.8, and 8.8% respectively. In Rainier Vista Housing, the rate is 14.8, 41.7, 39.2, and 4.3% respectively, which means fewer white and more black and Asian people (Fig. 3-5).

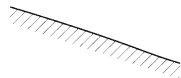
²⁴ Google Earth, <https://www.google.com/earth/>, 47.563609, -122.296890, cited 29 May 2015

²⁵ Washington State Geospatial Data Archive, https://wagda.lib.washington.edu/data/geography/wa_cities/seattle/index.html, access restricted to UW staff, faculty, and student, cited 29 May 2015

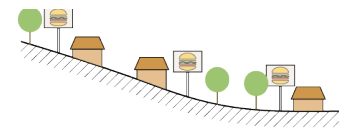
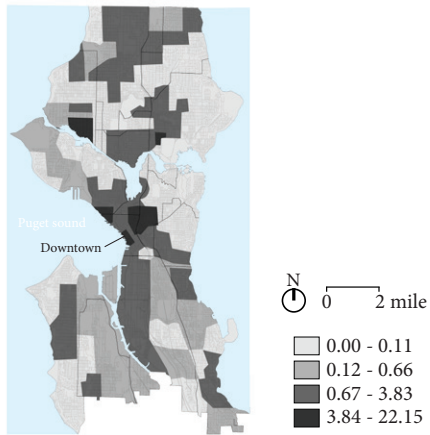
²⁶ Hurvitz, P. M., Moudon, A. V., Rehm, C. D., Streichert, L. C., & Drewnowski, A. (2009). Arterial roads and area socioeconomic status are predictors of fast food restaurant density in King County, WA. *The International Journal of Behavioral Nutrition and Physical Activity*, 6, 46. doi:10.1186/1479-5868-6-46



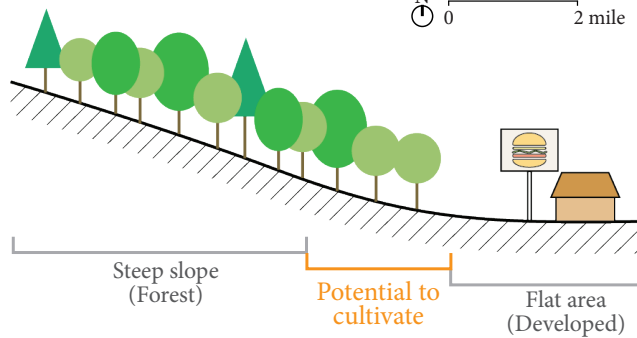
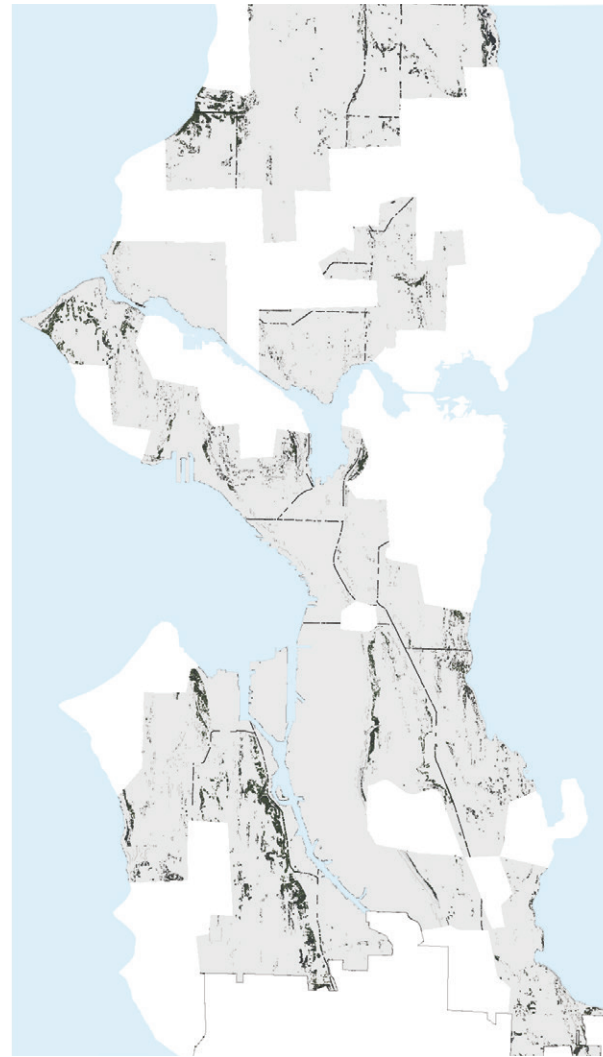
Green open space



Steep slope



Fast food restaurant density (n/km²)



Upper left: Fig. 3-1. Green open spaces
 Upper middle: Fig. 3-2. Steep slope
 Lower left: Fig. 3-3. Fast food restaurant density (n/km²)
 Right: Fig. 3-4. Overlaid map illustrating the potential of cultivation

Source: Google Earth, Washington State Geospatial Data Archive, Hurvitz PM et.al. (2009)

Food landscape in neighborhood scale

At a neighborhood scale, I narrowed the site to Rainier Vista and Mount Baker neighborhoods, and looked up green open spaces and several food related facilities.

In the neighborhoods, I looked up potential green open spaces as potential site for the cultivation and the location of food facilities (Fig. 3-6). There are

many parks such as Jefferson Park, Mount Baker Park, and Genesee Park. These parks are relatively larger, and they are connected by Cheasty Boulevard and Lake Washington Boulevard. Around the Cheasty Greenspace is an underutilized hill. The city of Seattle is planning to restore the hill as a native forest. However, the existing deciduous forest provides magnificent landscape for local residents. A strip of the forest could become an interface between the developed urban area and undeveloped nature.

²⁷ Rainier Vista - Seattle Housing Authority, <https://www.seattlehousing.org/redevelopment/rainier-vista/>, cited 29 May 2015

²⁸ City data, Seattle, <http://www.city-data.com/income/income-Seattle-Washington.html>, cited 29 May 2015

²⁹ Hurvitz, P. M., Moudon, A. V., Rehm, C. D., Streichert, L. C., & Drewnowski, A. (2009). Arterial roads and area socioeconomic status are predictors of fast food restaurant density in King County, WA. *Ibid.*

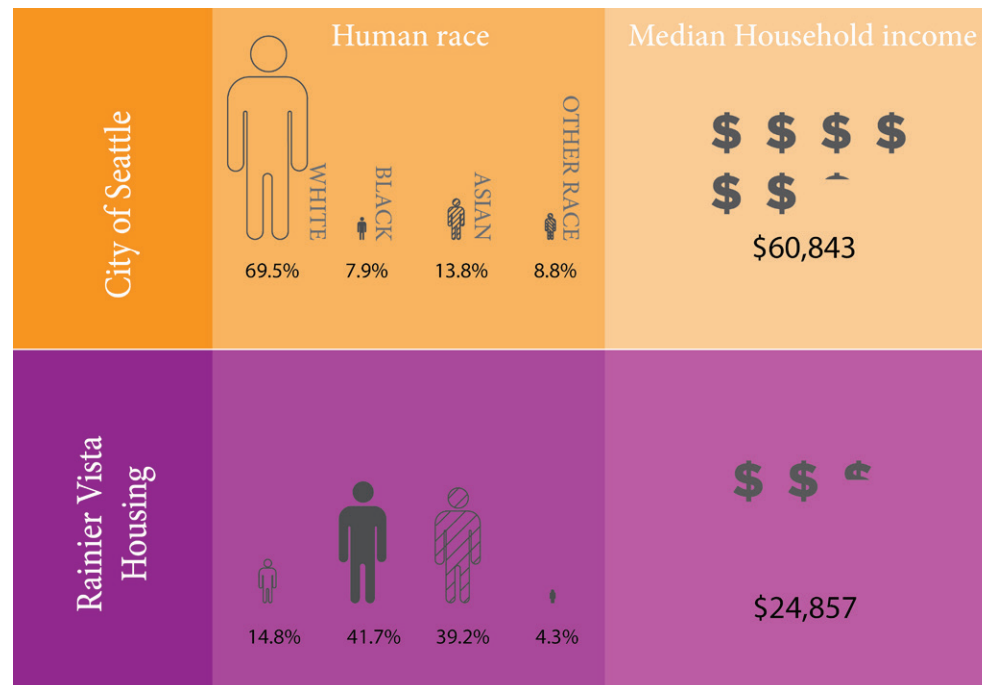


Fig. 3-5. Distribution of human race and median Household income in Seattle and Rainier Vista Housing

Source: <http://www.city-data.com/income/income-Seattle-Washington.html>

There are a plenty of fast food restaurants in the neighborhoods. Most of them are located along the Martin Luther King Jr. Way (Fig. 3-6). As I explained, fast food restaurants are usually dense along main arteries²⁹. In this area, there are middle-priced supermarkets such as QFC and Safeway as well as an Asian market called Foulee mart serving fresh products. Other than these supermarkets, there are food providers such as Beacon Food Forest, Seattle Community Farm, and Rainier Vista Food Bank, which are active as NPOs. Therefore, people living in the neighborhoods presumably have access to fresh food if they want it. However, around this area is known for the high rate of diabetes³⁰ (Fig. 3-7). As Diabetes is a lifestyle diseases³¹, presumably the lifestyle of Rainier Vista residents is less healthy than people living in other areas of Seattle. They might be not aware of the importance of obtaining fresh food.

Taking a close-up look at the area around Rainier Vista Housings, Martin Luther King Jr. Way and S Columbian Way are main arteries. Light rail passes through the MLK Way. Rainier Vista Housing is along the west of MLK Way, and the roads in the housing are walkable due to light traffic (Fig. 3-12). One of the most important facilities that I would like to mention is a Boys and Girls Club of America, which offers after school activities for teens. The facility is close to the hill behind the housing. It would be



Fig. 3-6. Potential green open spaces engaging cultivation and location of food facilities

Source: Google Earth, <https://www.google.com/earth/>, 47.563609, -122.296890,

possible for teens to get involved in activities taking place on the hill. Seattle Community Farm is on the skirt of the hill. It is still active and provides plenty of vegetables to the nearby food bank (Fig. 3-11).

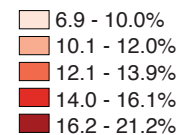
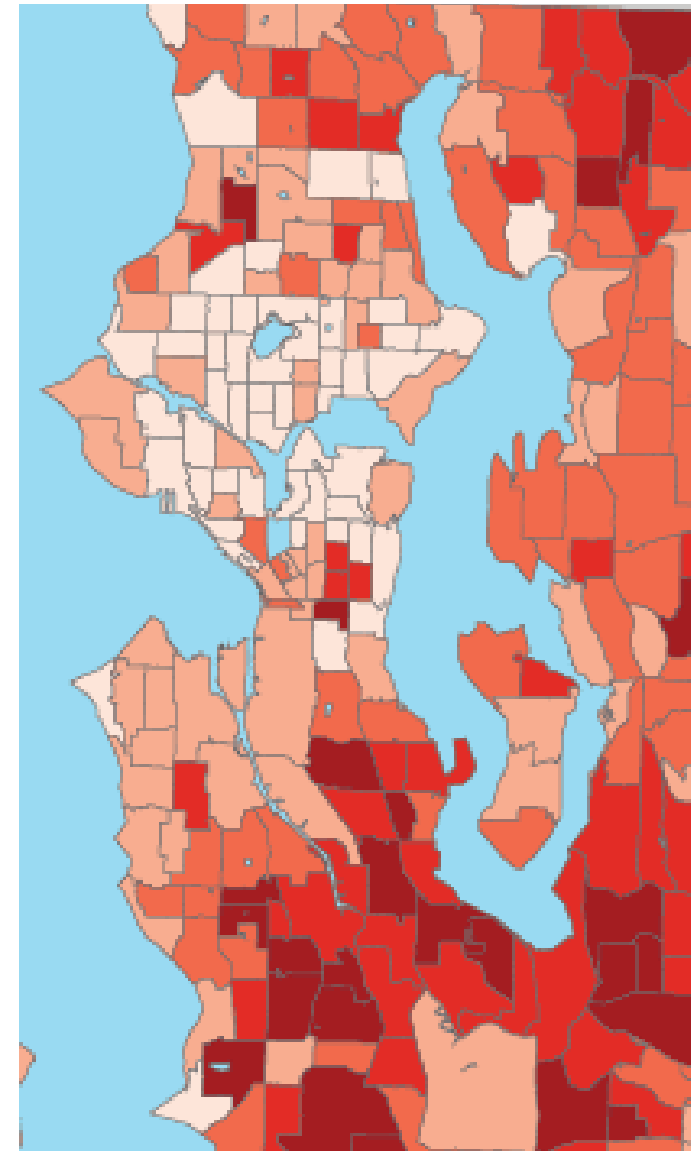
On the strip of the hill, there are three types of open space for the public (Fig. 3-8). Seattle Community Farm, which I mentioned before, is an open space, where local residents are able to have parties or meetings. Children’s Park connected to the farm is not actively used. Going up to the hill from the Children’s Park, you reach View Point Park. This is the highest point in Rainier Vista Housing, yet you cannot see a splendid view from there. Underneath is a cistern that stores water during heavy rains. Speaking of rain, the soil in the forest consists of hard clay soil, so that stormwater does not percolate through the native soil (Fig. 3-9). Looking at the forest, you find some areas of the forest are located on gentle slope. The area close to View Point Park is almost flat and people can easily get inside. On the other hand, most of the southern parts of the forest are steep and difficult for people to enter.

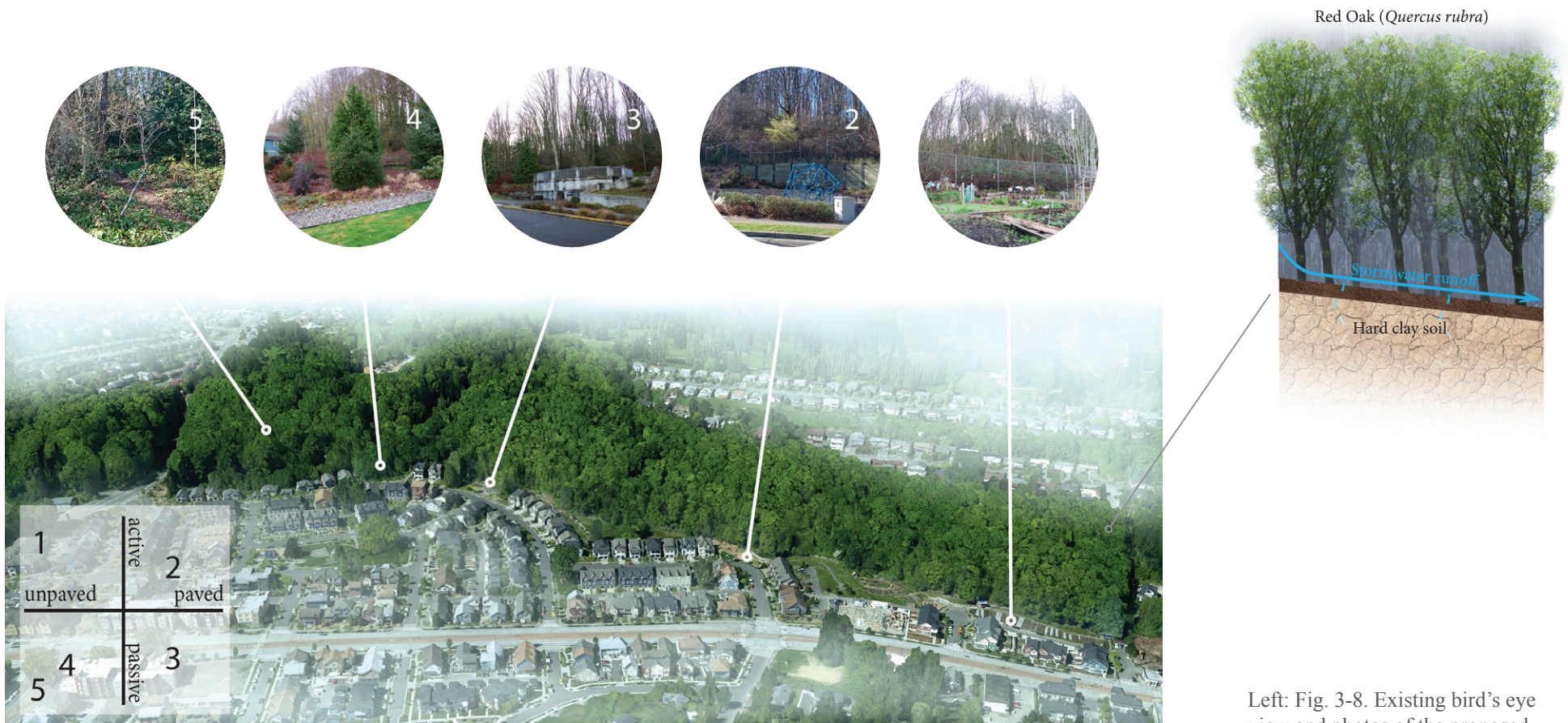
³⁰ Drewnowski, A., Rehm, C. D., Moudon, A. V., & Arterburn, D. (2014). The Geography of Diabetes by Census Tract in a Large Sample of Insured Adults in King County, Washington, 2005–2006. *Preventing Chronic Disease*, 11, E125. doi:10.5888/pcd11.140135

³¹ Definition of lifestyle disease, <http://www.medicinenet.com/script/main/art.asp?articlekey=38316>, cited 11 June, 2015

Fig. 3-7. Diabetes prevalence in King county, WA, 2005

Source: Drewnowski et. al. (2014)





Left: Fig. 3-8. Existing bird's eye view and photos of the proposed site

Top: Fig. 3-9. Existing section of the proposed site

Source: Google Earth, <https://www.google.com/earth/>, 47.563609, -122.296890,



Top: Fig. 3-10. Existing forest (Red oaks)

Middle: Fig. 3-11. Existing slope analysis

Bottom: Fig. 3-12. Existing transportation flow

3.2. Interview with Significant Food Activists

Interviews are one of the most basic research methods within social science. Through conversations with interviewees, researchers are able to discover the innate issues behind topics. I could use multiple types of research methods for this thesis topic, but asking people directly about what is happening is sometimes a direct short cut to reach an answer. For instance, when I find a good precedent that could be applied to my design site, it might be better to ask speak to the activists who are engaged in it directly rather than attempting other analyses. When I focus on the meaning of a particular phenomenon, interviewing participants would be quite useful in clarifying the meaning³². For instance, if I want to explore the significance of local food systems, interviewing activists would be useful.

I conducted interviews with Scott Behmer, a founder of Seattle Community Farm, and Jacqueline Cramer, a co-founder at Beacon Food Forest. This is because they are advocates of recovering food system by running an edible garden or community farm.

The contents of the interview should be carefully considered. Scott produces vegetables with the help of volunteers. However, the process of scouting

volunteers, where they come from, and how they work was unclear. I asked to clarify how he thinks about community engagement, which is directly related to my proposal. My questions focused on the relationship between the neighborhood and the farm, programs the farm offers, and response to my ideas. Since I think Beacon Food Forest is one of the most successful examples of a project that engages knowledge of nature through edible gardens, I asked Jacqueline Cramer about her methods of implementation. I also asked her about the relationship between the neighborhood and the farm.

From these interviews, I obtained three lessons. First, there are many volunteers that are interested in crop works in Seattle. Volunteers are usually groups of people and come from neighborhoods, schools, and companies as a social service. I also heard volunteers from private companies are big groups. To my surprise, 100-120 volunteers come to work at Beacon Food Forest once a month. Taking this into consideration, launching such projects is not hard in terms of finding volunteers. The problem to be solved is how to make the farm more attractive to local residents.

Second, adjacent neighbors are not particularly interested in the works or free to work on them. However, once the project became more famous,

³² Robson, C. (2002). Real world research: A resource for social scientists and practitioner-researchers. Ch. 9: "Interviews." Oxford, UK: Blackwell Publishers. In Real World Research.

several educational institutions invited the founders to give students lectures. Scott wants to invite many local residents to the farm. However, they are too busy to join the work. In his program, after the voluntary work at the farm, the participants can obtain fresh vegetables. Even though he offers such a program, locals might not to join the work because fresh food is available at Rainier Vista food bank. In contrast, Jacqueline has been teaching classes at elementary schools and high schools close to Beacon Food Forest. I think simply having the neighbors participate in the activities I propose would be difficult. And that inviting educational institutions to join the project would be better than providing opportunities for locals to engage in cultivation and maintenance.

Third, they have already been started programs on getting in touch with nature and farming. In the case of Seattle Community Farm, he offers children, who come from B&G Club and refugee alliance, summer programs such as cooking, seeding, and nutritional learning. It is a good opportunity to know some parts of the local food system. Jacqueline is about to start her class on permaculture gardens. She teaches local residents how to implement permaculture in their own gardens. This class makes participants think about the ecological system, as well as the aesthetic aspects of gardens. Therefore, I have to think of the value of my proposal not only in terms of activities, but also as a way of creating novel experiences for visitors.



Left: Fig. 3-13. Planting plan at Beacon Food Forest
Right: Fig. 3-14. Nursery of mushroom at Beacon Food Forest

Photo credit: Hiroki Baba

3.3. Conclusion

The site analysis began at the scale of the city in Seattle, looking at potential land that could be cultivated, especially green open spaces and areas near steep slopes. By overlaying these locations with a density map of fast food restaurants, the area near Rainier Vista Housing was selected as a case study site. The site is located at the base of a hill behind the housing structures. There are many fast food restaurants along the main arterial road. However, there are also some supermarkets, community farms, and a food bank, where local residents are able to obtain fresh food regardless of their income. This area is still known for the high rates of diabetes. Diabetes is considered a lifestyle disease. This indicates the lifestyle of local residents is less healthy than people living in other areas of Seattle. Thus, it is important to promote consumption and production of fresh food in this neighborhood.

From interviews to Scott Behmer and Jacqueline Cramer, the following became clear. Many volunteers are willing to work at Beacon Food Forest and Seattle Community Farm. Yet it is still difficult for local residents to engage in the work. Adjacent neighbors are not so much interested in the work, or do not have the free time to participate, as a result. It is better to start out working with educational institutions

to, so that students can learn about fresh food and engage in cultivation. Both Beacon Food Forest and Seattle Community Farm have already been starting programs for food education. My proposal involves not only activities, but also novel experiences for visitors so as to increase interest and participation in such programs.

All in all, this site analysis outlines both nationwide and site-specific information. My topic is recovering the local food system, so that lessons from site analysis were valuable for the following. The site does not seem to be entirely disconnected from the local food system since some supermarkets and community farms exist in the neighborhood. However, a large number of fast food restaurants, high rates of diabetes, and the lack of participation of local residents in farm activities suggests that the site is somewhat segregated from the local food system. To deal with the issue, I propose a wide range of activities that connect the site to the local food system in the following chapter.

4. Design Proposal

4.1. Concept and Program

To reduce the segregation of the local food system and foster healthy and fruitful lifestyles, I would like to create places that promote activities for learning about food. These include not only the place with programs to learn food production deliberately, but also places where people can engage in a variety of different physical, social, and recreational activities. Through cultivation of the underutilized hill, people participate in a wide range of activities such as planting, harvesting, and cooking. Participants and visitors are able to learn about eco-systems, seasonality, and diverse cultures in the neighborhood through these activities. These serve as significant parameters and outcomes of strengthening local food systems.

There are a wide range of activities that are related to a local food systems in my proposal (Fig. 4-1). Growing part, growing rice, fruit, and herbs are some of the activities. On the site, a series of

cultivated spaces are located along the base of the hill Primary cultivated areas are rice field, orchard, and herb garden. Visitors could not only grow rice, fruit, and herbs, but also harvest them. They have an opportunity to prune trees at the orchard, and can learn how to dry herbs at the herb garden, and make rice straws at the terraced rice field. These activities belong to growing, harvesting, or processing parts of the local food system.

After the fresh vegetables, fruit and crops are harvested, remaining products could be donated to Rainier Valley Food Bank. Already, Seattle Community Farm is donating their products to the food bank, thus it is welcomed by adjacent neighborhoods. If participants of the hill want to make a profit, it is possible to sell fresh vegetables and fruit by truck or bike. There are several precedents for this approach. In Orlando, Florida, The Fresh Stop Bus provides fresh vegetables for locals³³. The bus moves around food dessert areas, making it easier for local residents to obtain fresh food. It is a nonprofit program supported by the Central Florida community, so if the hill proposed is tied with the City of Seattle, it could be possible. People in Seattle like such fresh products and most of the areas are not walking distance to the closest supermarket. If food truck or food bike become more active, local residents gain access fresh vegetables and fruit more easily.

³³ The Fresh Stop Bus, <http://www.thefreshstopbus.com/>, cited 29 May 2015

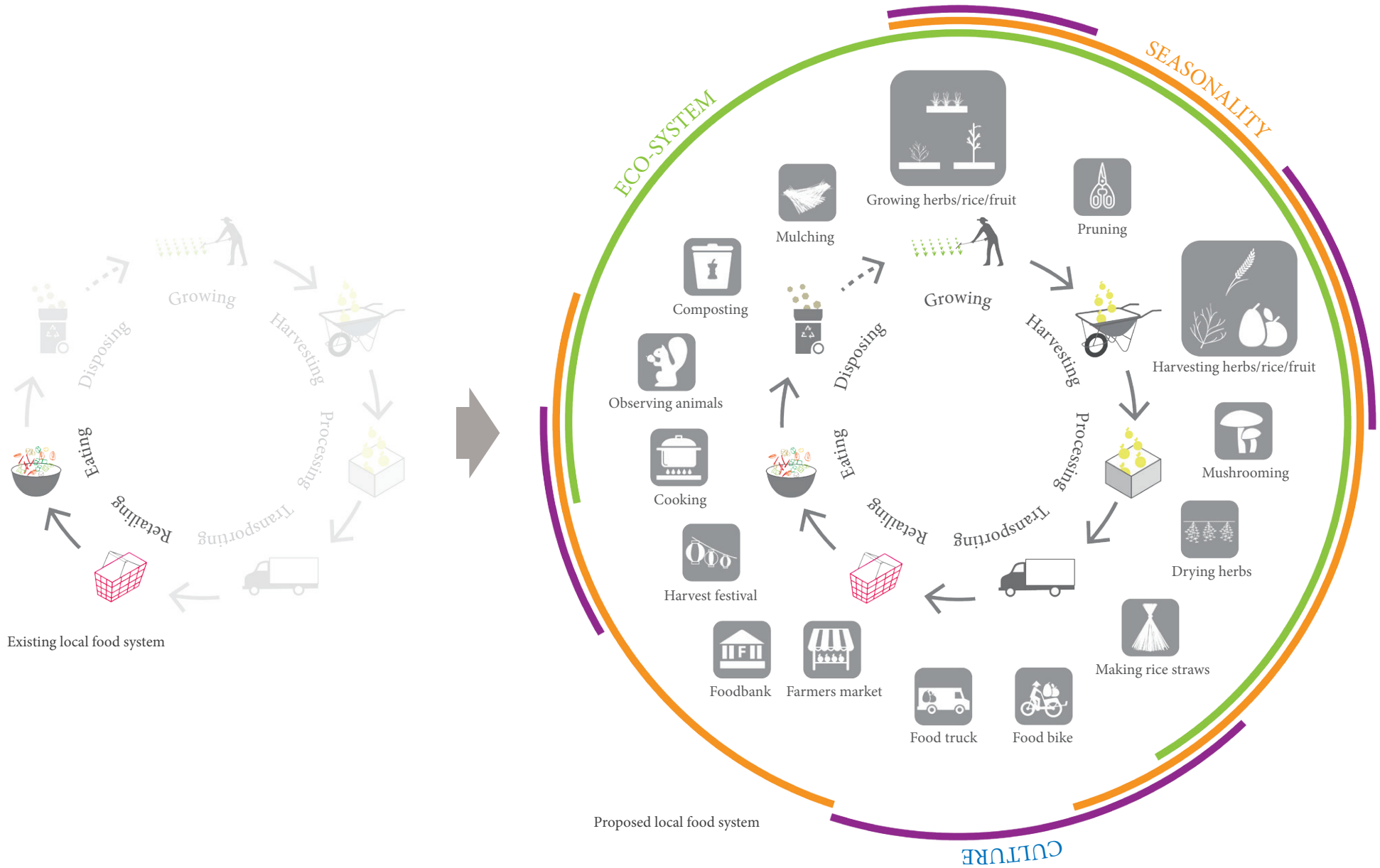


Fig. 4-1. Proposal for local food system

Rainier Valley Food Bank and farmers market have potentiality of enhancing the retail related aspects of the food system. As I mentioned, the proposed design has the potential to connect with the food bank. There is farmers market that is held near the Seattle Public Library Columbia City Branch, and it is easy to sell fresh vegetables and fruit. Food trucks are also related to retail part of the local food system. Those programs help local people obtain fresh product easier and encourage them to know more about fresh food.

Moving back to the hill, a place for cooking and having festivals is proposed in association with the eating part of the local food system. There is an existing gathering area close to Seattle Community Farm, and Scott, who is the founder of the farm, wants to invite more locals. Therefore, designing some activities there would benefit both providers of fresh food and visitors. In the forest area, visitors are able to watch animals eating forage such as acorns, mushroom, and crops, which encourage them to learn about forage food.

Food disposal is the last part of the local food system. I suppose some wastes will be generated from the activities. Thus, composting box should be dispersed in the hill. For example, rice straw can be utilized as mulching, which is a traditional practice in Asian countries.

4.2. Strategy and Site Systems

In response to these conceptual foundations, gradients of eco-systems, seasonality, and cultural diversity on the hill are derived from existing conditions. Also a trail and a series of retention ponds are planned according to slope angles and watershed. Each retention pond makes spaces for people to get together.

To make an intervention through the base of the hill, a trail passing through the hill is planned (Fig. 4-2). Based on the existing slope angles, the trail generally follows the edge of the hill. However, the trail passes through the forest at the south of the hill due to the steep slope. Because the soil comprises mostly of clay, the hill has to deal with stormwater management. I divided the site into six parts with the consideration of watershed, and put either a retention pond or a cistern on each site. Those facilities for stormwater detention are utilized for irrigation and ecological habitats. After the intervention, people are able to walk along the base of the hill, so that the trail and M.L.K. Way provide circulation around the neighborhood. After visitors arrive by either car or light rail, they can easily access the hill. This makes the neighborhood more dynamic and strengthens the relationship between urban and natural systems.

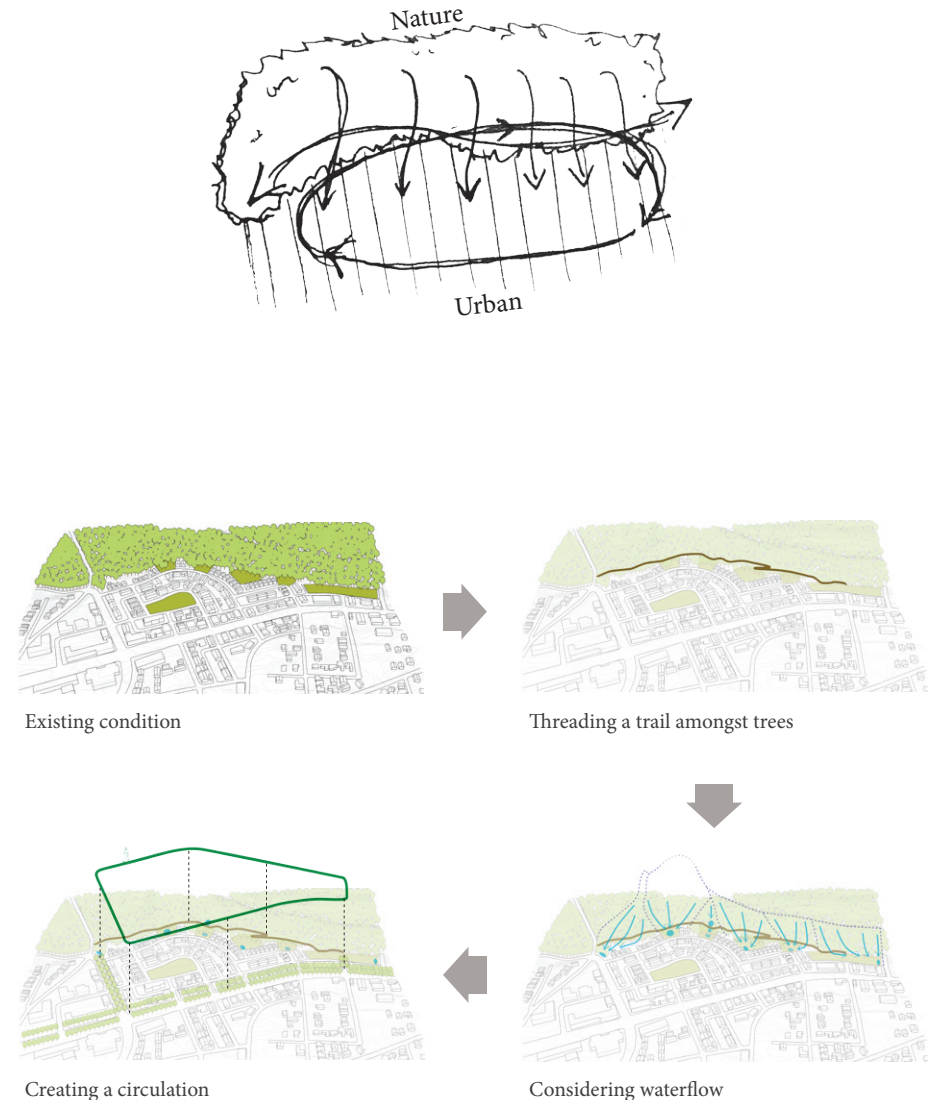


Fig. 4-2. Spatial intervention for the proposed site



Forage Forest



Forage Garden



Terraced Rice Field



0 100 200 400 ft

ECO-SYSTEM



- Natural
- Cultivated

Top: Fig. 4-3. Plan
 Right: Fig. 4-4. Spatial gradient of sub-themes



SEASONALITY



More variety
Less variety

CULTURE



More diverse
Less diverse

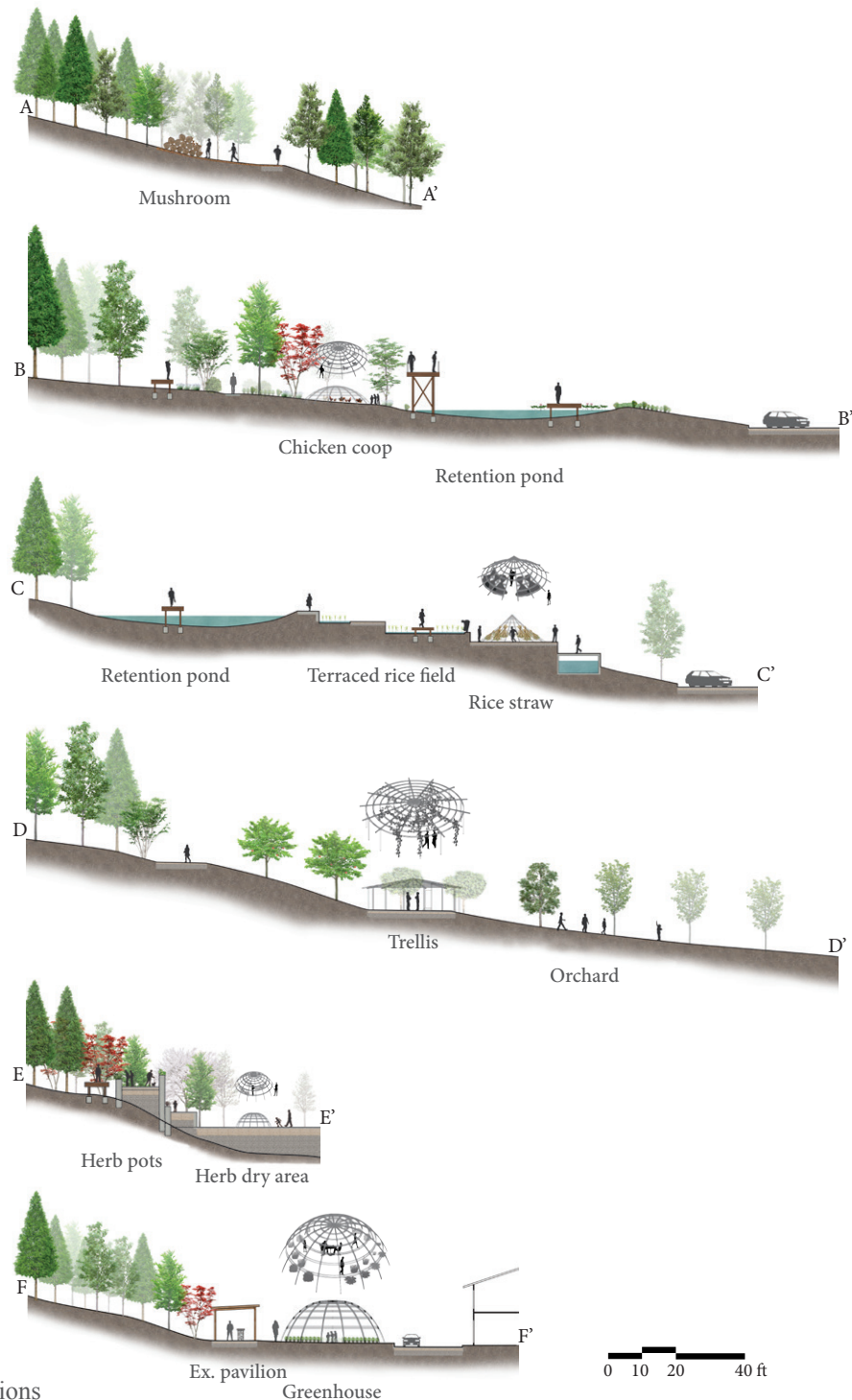


Fig. 4-5. Sections

The forest on the hill has gradients that relate the sub-themes of ecosystem, seasonality, and culture (Fig. 4-4). Existing trees are mostly red oak and maple as well as a few coniferous trees. In my design, I plant evergreen trees, conifer trees, and shrubs as well as deciduous trees. The southern part of the forest is an especially natural area where substantial numbers of wild animals and insects come to find food. Thus, southern part of the forest would be more natural looking. On the other hand, vegetation in some areas such as terraced rice field, orchard, and community space would be comprised of cultivated plants. They are different from naturally looking plants, but make the hill more ecologically diverse.

Seasonality is one of the most important aspects of nature. Carefully looking at seasonal transitions, we can understand more about nature and how we are connected to it. It is sometimes easier to observe seasonal transitions on cultivated land. In order to emphasize seasonality on the hill, I consider both the rice field and orchard areas as important ones. The former inform visitors of dry and wet seasons which are typical transitions in Seattle. The latter reminds visitors of seasonal difference because visitors can watch various types of fruit harvested depending on seasons. Aside from these areas, community areas are also sensitive to seasonal change, because they have cooking classes using fresh vegetables and fruit.

Food is deeply associated with culture. People do not necessarily eat food in a traditional way, but food can promote an understanding of cultural diversity. With this in mind, I put various types of herbs related to cultural foods in the neighborhood, so that local residents recognize cultural diversity in Rainier Vista Housing. Those herbs are to be cooked at the community area, donated to the food bank, or sold at the farmers market. Local residents will have the opportunity to use those herbs in their own homes.

After considering three types of gradients and approaches to spatial intervention, I designed six different areas on the hill: forage forest, forage garden, terraced rice field, orchard, herb garden, and community greenhouse.

Forage forest offers variety of forage for wild animals and birds. The planting plan is related to wildlife species found in Seattle, and includes a variety of plants including mushrooms. Forage garden allows visitors to observe what and how wildlife eats and behaves from various angles. This garden is also intended to be a race of forage but vegetation would be more organized compared to the forage forest. Terraced rice field is a cultural cultivated form that reminds visitors of seasonal transitions. Responding to the climate in Seattle, stormwater is stored during winter and it is discharged into the rice field during summer. Orchard gives visitors plenty

of fresh products in response to seasonal transitions. Maintenance such as pruning is conducted as an after school activity by the Boys and Girls Club of America. Herb garden gives visitors an opportunity to look at various types of herbs that are connected to cultural food. It is also designed as a rain garden, thus it does not need high-maintenance. Community greenhouse functions not only as a literal greenhouse to grow plants, but also as a meeting place for local residents. In October, local residents can hold a harvest festival, bringing fresh vegetables and fruit harvested on the hill.

Forage forest

The forest provides various types of forage for wild animals and insects (Fig. 4-6). Acorns from red oak are nutritional food for squirrel. Douglas fir and red cedar's leaves are sometimes eaten by herbivorous animals and insects. If ash trees are planted on the hill, woodpecker might come to hunt for food. Mushrooms are also good forage for animals and birds such as blue jays. Even humans like to eat mushrooms such as shiitake and oyster mushrooms. Hazelnut is good source of obtaining energy for both animals and insects. Cricket likes such nuts. The forest is natural looking and through the observation of animals, birds, and insects, visitors can learn the dynamics of ecosystem.



Fig. 4-6. Perspective of proposed forage forest



Bird feeder

Mushroom

Forage garden

Compared to forage forest, this garden is more manicured and more shrubs and grasses are planted (Fig. 4-7). The plants include rhododendron and Japanese barberry that are good for honeybees. Humming bird sucks honey out of honeysuckle and salvia. Some birds like northern flickers like to eat berries from wild cherry trees. In some parts of the garden, crops are also planted for poultry. There is a chicken coop near the pond, and maize and snap pea are planted nearby. These crops also invite rabbits to the garden.

Visitors can observe animals eating forage from various angles. A bypass deck sticking out of the trail slopes up and visitors can touch and smell leaves of trees. They can even pick cherries from the deck. They can walk over the retention pond, which gives them another view to look at the garden.

As a summary of ecosystem's interconnection, figure 4-8 shows the relationship between animals, birds, and insects and forage. This looks complex but the comprehension of such complexity makes the planting plan better at creating forage forest and garden.

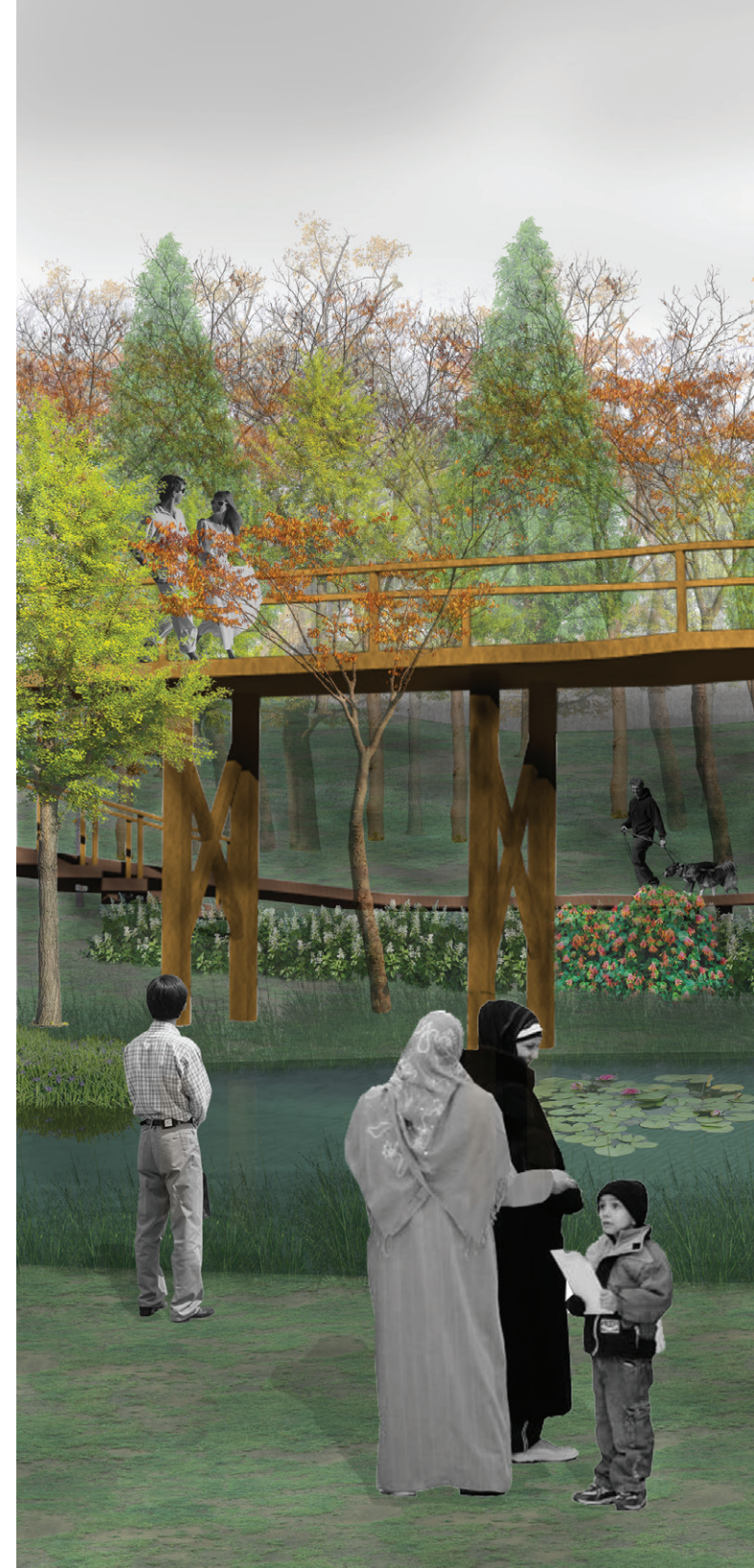


Fig. 4-7. Perspective of proposed forage garden



Dogwood

Wild cherry

Trail

Chicken coop

Rhododendron

Japanese barberry

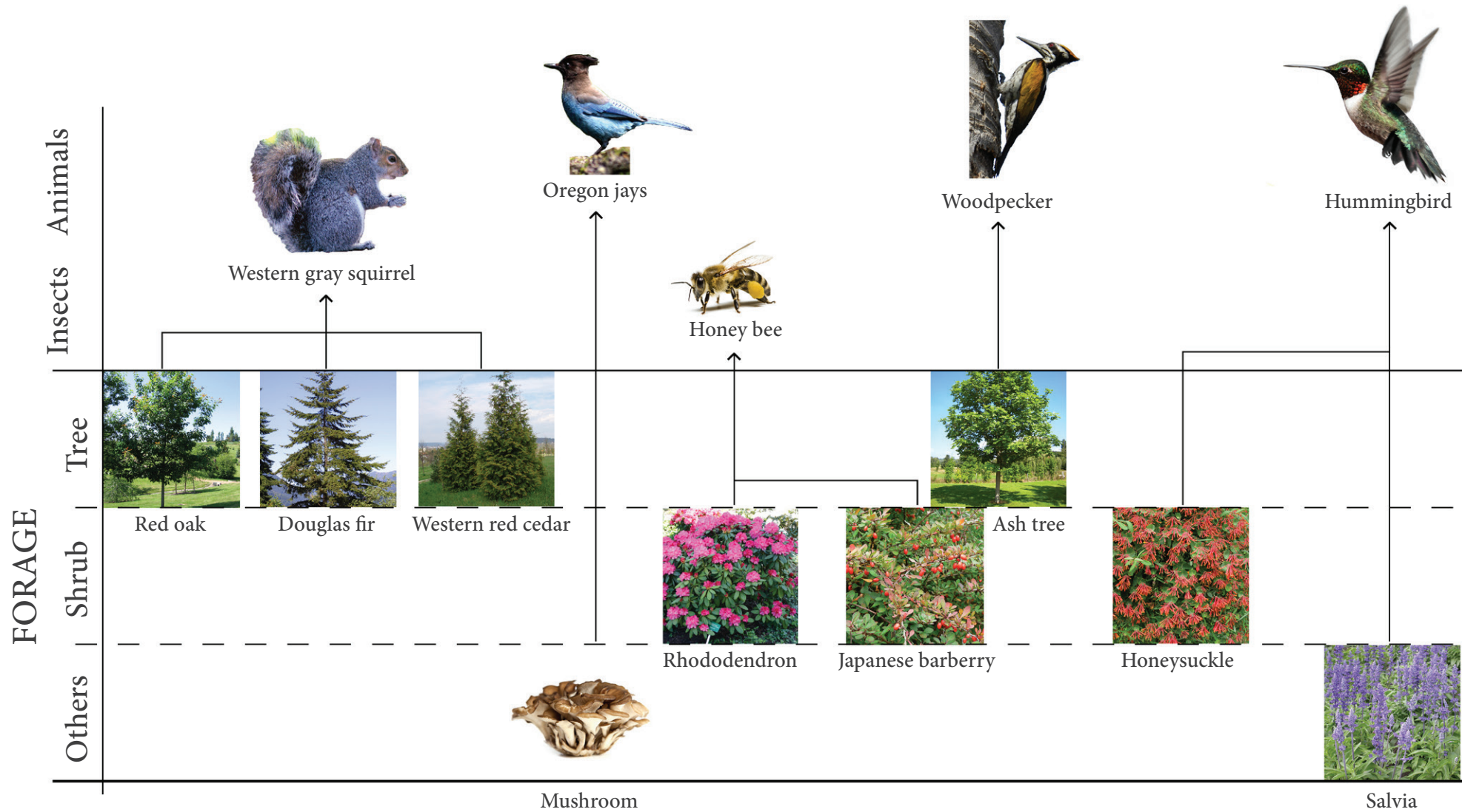


Fig. 4-8. Planting plan related to forage



Nothern flicker



Mallard



Chicken



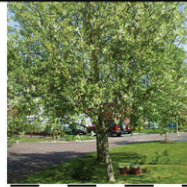
Rabbit



Cricket



Dogwood



Wild cherry



Hazelnut



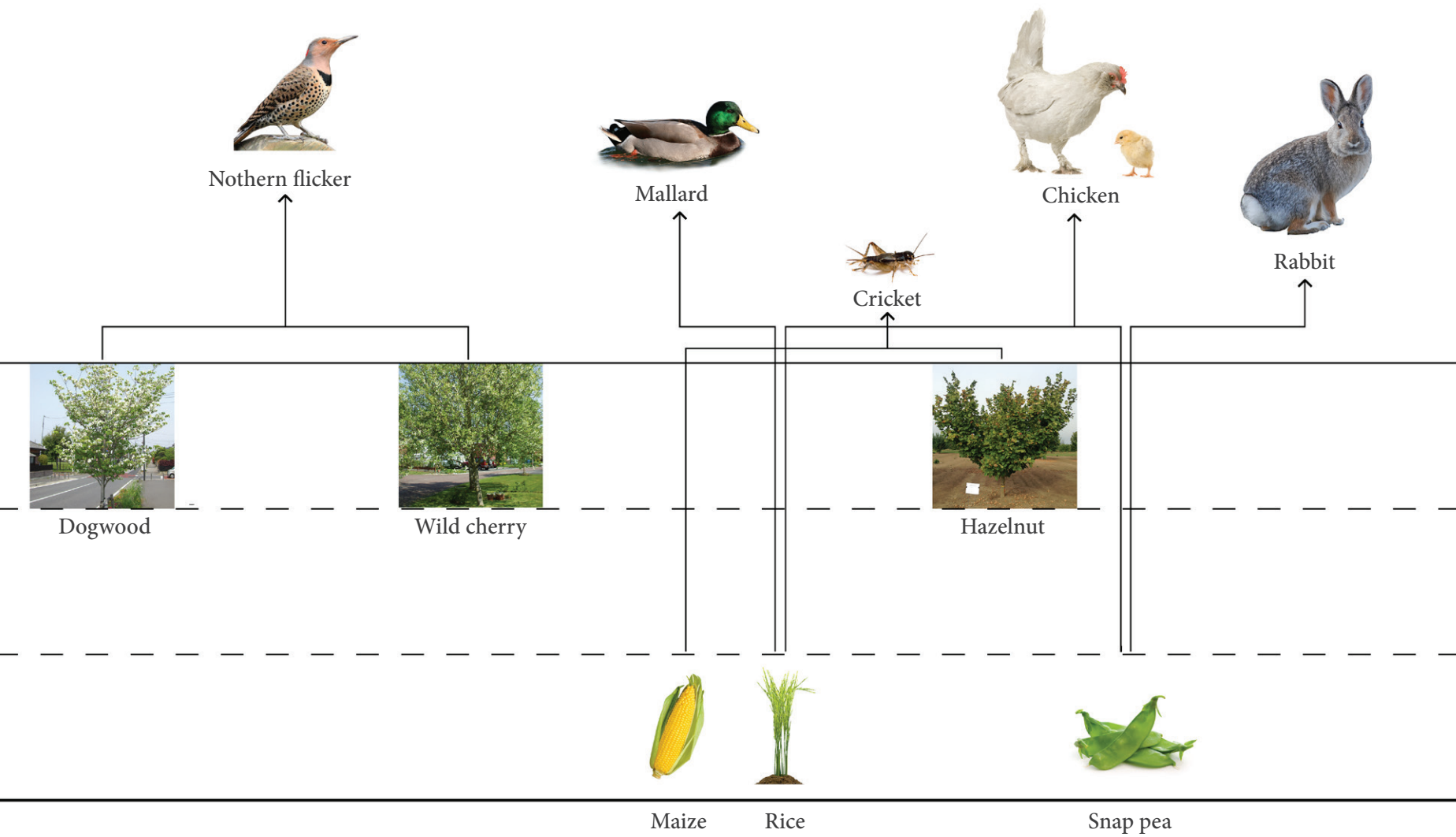
Maize



Rice



Snap pea



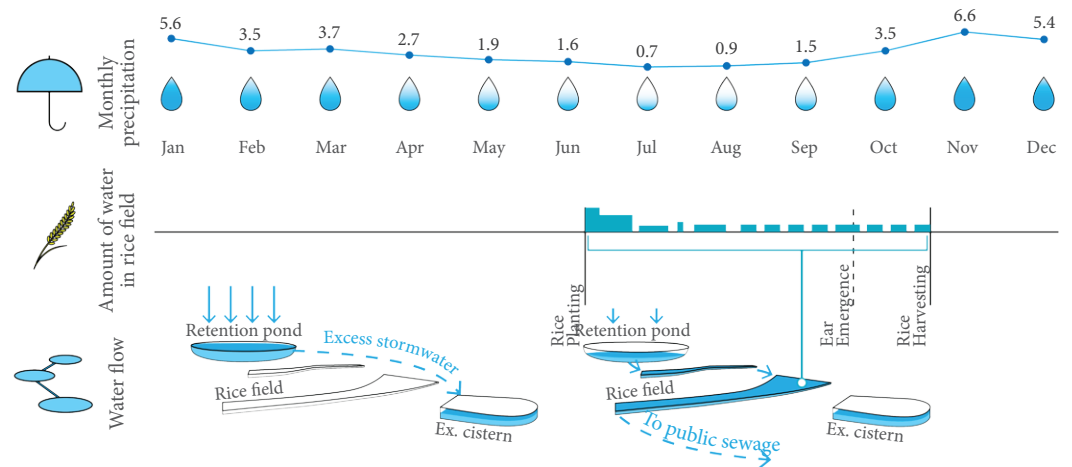
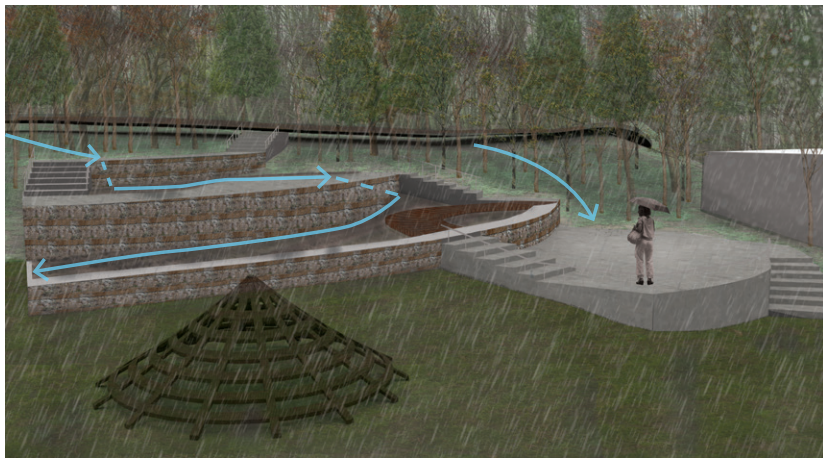
Terraced rice field

The rice field was previously a viewpoint park. Keeping the good view, I tried to take advantage of stormwater and cultivated a small parcel of rice field (Fig. 4-11). The form drew upon inherited traditional Vietnamese terraced rice fields. There are three terraces and the highest terrace is connected to the trail. It allows visitors not only to experience the growth of foods they eat, but also to feel seasonal

transition through the dynamic change of the landscape and its water system (Fig. 4-9). As for the water system, stormwater is stored during winter because of the climate in Seattle. However during summer, it is discharged into the rice field (Fig. 4-10).

Left: Fig. 4-9. Perspective of proposed terraced rice field in winter
 Middle: Fig. 4-10. Water system with seasonal consideration
 Right: Fig. 4-11. Perspective of proposed terraced rice field in autumn

Source: Seattle Monthly Averages and Records, <http://www.seattle.gov/living-in-seattle/environment/weather/averages-and-records>





Rice field

Rice straw

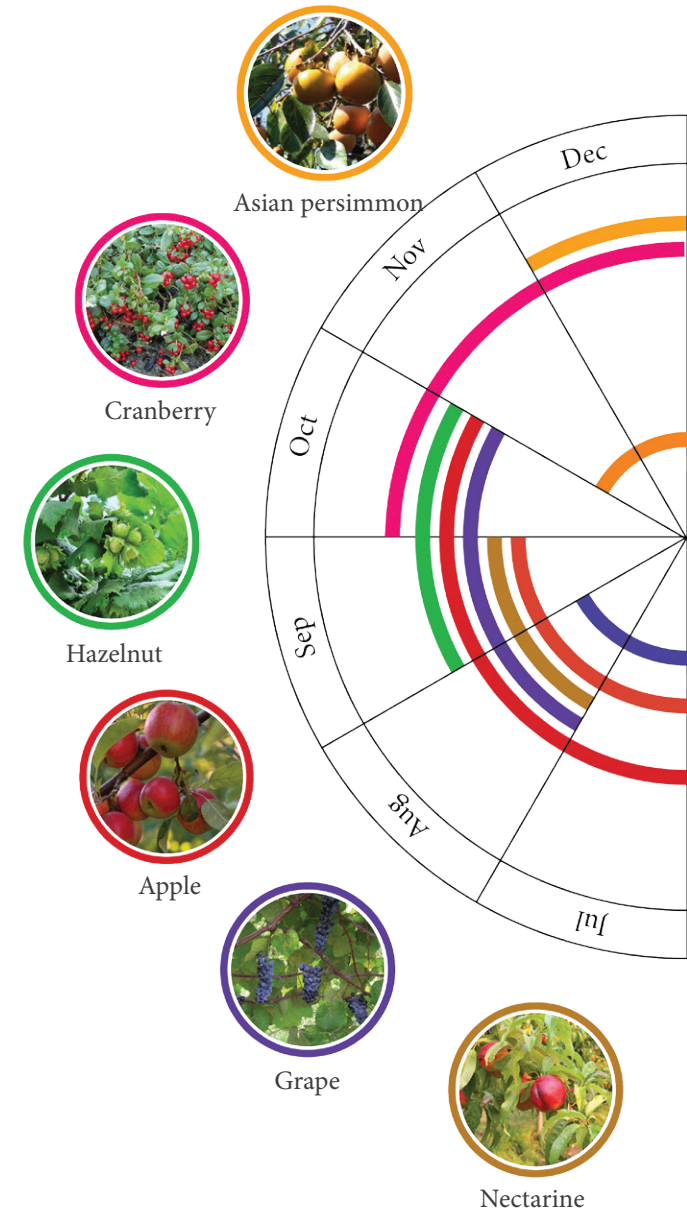
Trail

Duck

Ex. Cistern

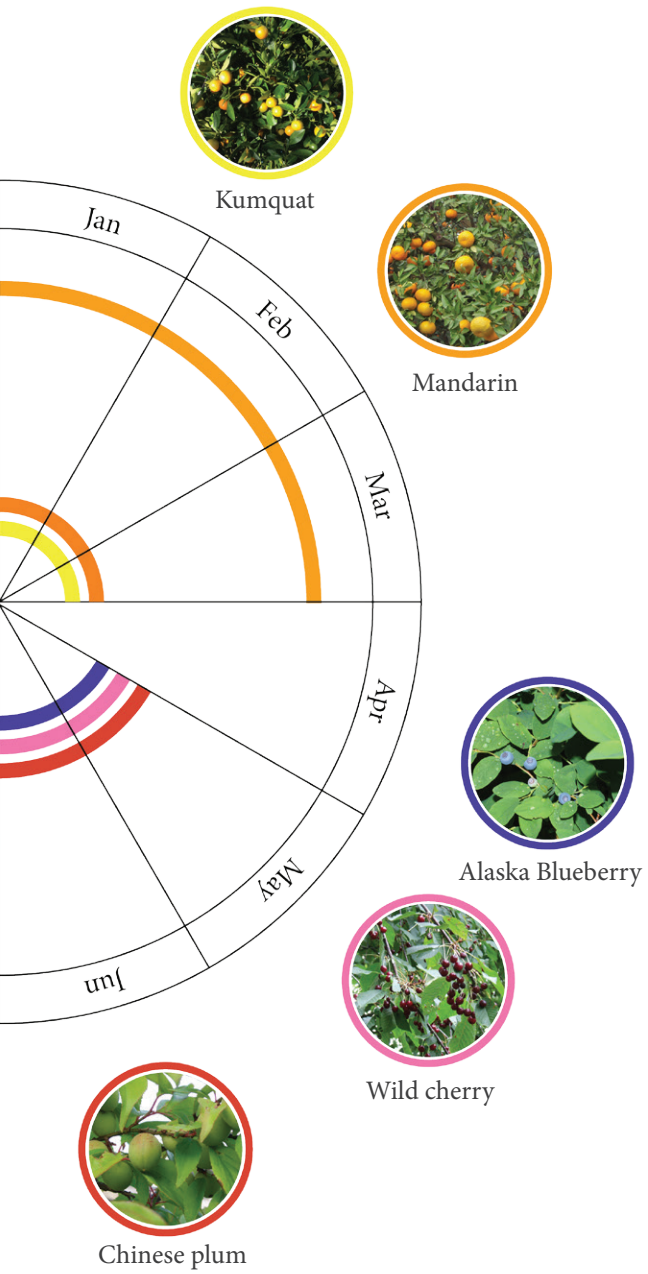
Orchard

Orchard gives visitors plenty of fresh products during different seasons (Fig. 4-13). According to figure 4-12, Alaska blueberry, wild cherry, and Chinese plum can be harvested in spring. With the blooming of many flowers, this season gives visitors the strongest impression of the four seasons. In late summer, nectarine and grapes start bearing their fruit. The autumn season is best for harvesting. Nectarine and grapes are still available for harvesting. Apple, hazelnut, and cranberry can be harvested as well. During winter, some fruit trees show seasonality. Asian persimmon and mandarin remind Asians of the climate in the region they came from. Maintenance such as pruning, it is conducted as an after school activity by the Boys and Girls Club of America.



Middle: Fig. 4-12. Seasonal fruit trees chart

Right: Fig. 4-13. Perspective of proposed orchard



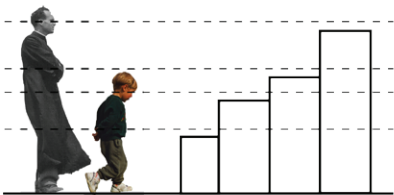
Herb garden

Herb garden gives visitors an opportunity to look at various types of herbs that are connected to cultural food. As I explained on chapter 3.1., Rainier Vista Housing is culturally diverse. There are many Vietnamese, Somalian, and Arabic people living in this community, as well as Thai, Indian, and Hispanic. In my proposal, various types of herbs associated with cultural food are planted in planters (Fig. 4-16). For instance, Thyme is associated with Middle Eastern and Cajun food. Those herbs have their own optimal sunshine/shade and soil moisture conditions. Reflecting the conditions, those herbs are to be planted.

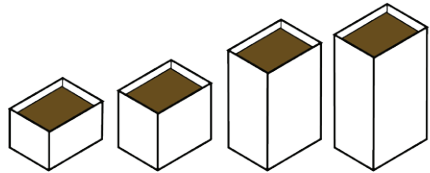
The herb garden is also designed as a rain garden, thus it is not need high-maintenance (Fig. 4-17). If it rains, stormwater comes from the upper part of the hill, and such stormwater flows into each herb planter. The planters have multiple heights, so that visitor are able to touch, smell, and watch them (Fig. 4-15). The heights are also associated with soil moisture. Thus, the higher the planter is, the less the soil moisture there is.

Top: Fig. 4-14. Bird's eye view of proposed herb garden

Bottom: Fig. 4-15. Incremental herb planters and herbs with diverse height and texture



Incremental herb planters

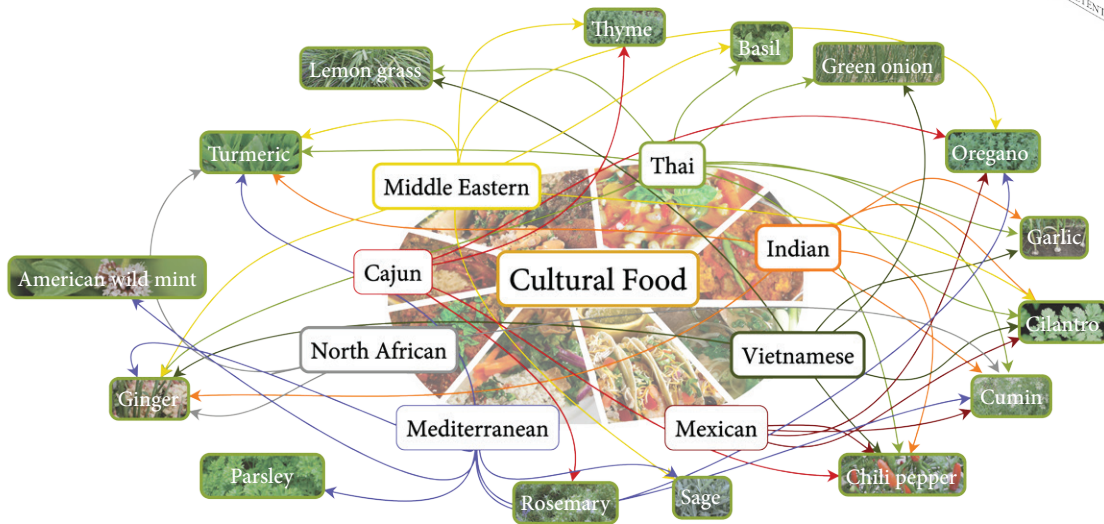
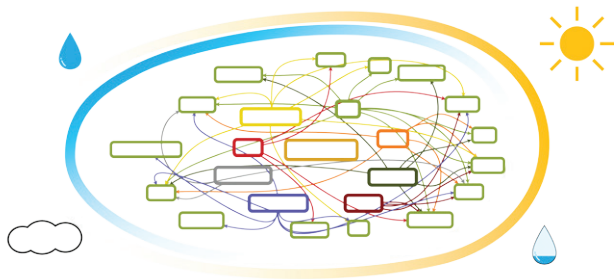
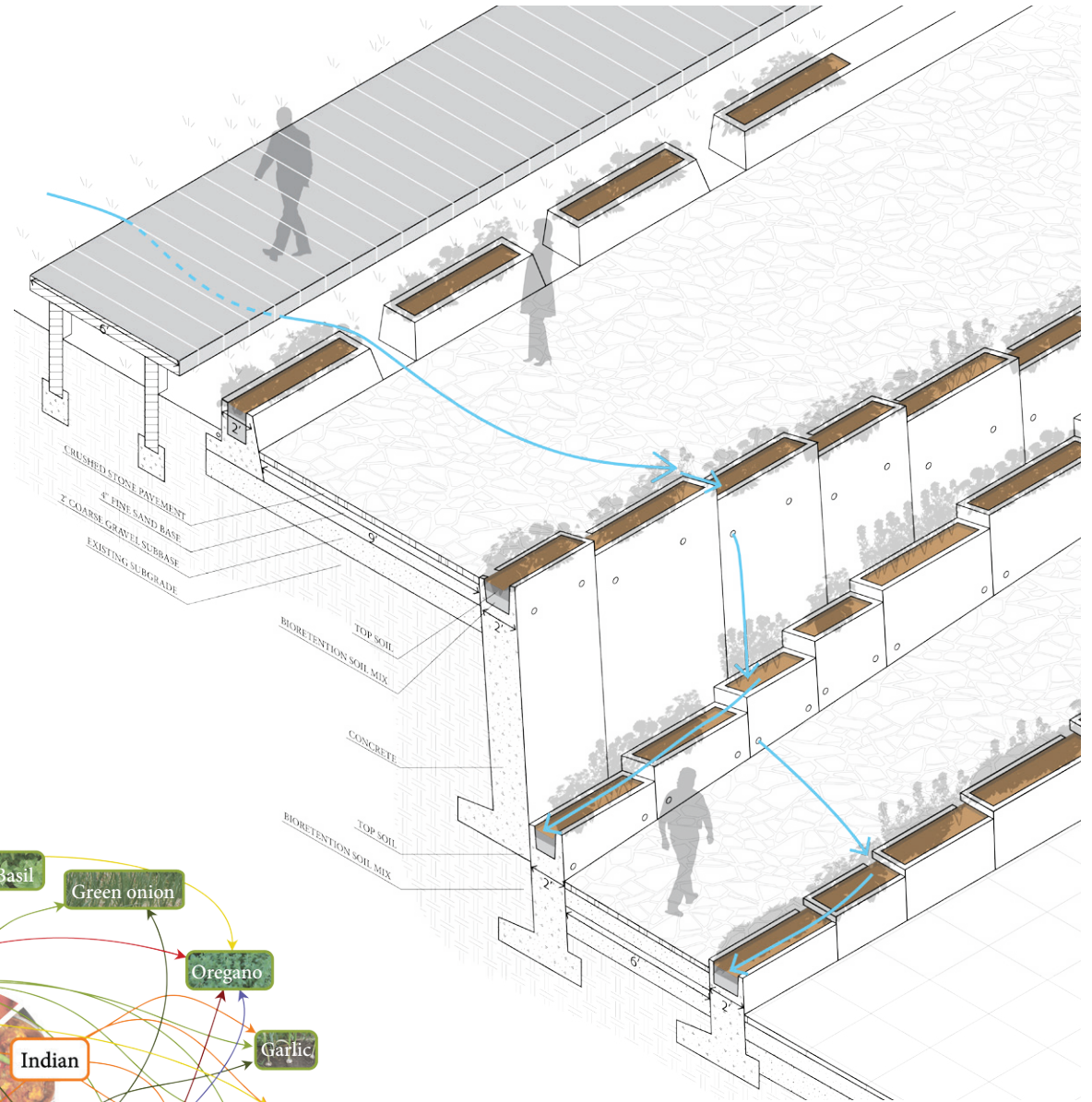


Plants with diverse height and texture

Left: Fig. 4-16. Herbs used by various types of cultural cuisine and their sunlight and soil moisture conditions

Middle: Fig. 4-17. Axonometric diagram of herb garden

Right: Fig. 4-18. Model photo of the proposed herb garden





Community greenhouse

Community greenhouse functions not only as a literal greenhouse, but also as a meeting place for local residents (Fig. 4-19). There are three existing kitchens in the community area. I take advantage of these facilities and create a place for people to get together. Some herbs such as cumin are not able to grow in this region, but in the greenhouse, it is possible to do it. In October, local residents can hold a harvest festival, bringing fresh vegetables and fruit harvested on the hill.



4.3. Implementation and Future Linkages and Development

Organizing stakeholders and users

The Fresh Hill Behind is a multi-use hill. In the morning, local residents, probably mainly seniors, come to the site and walk around the hill for their health. During the day, voluntary workers from NGOs and private companies visit the hill to perform maintenance. At the same time, students from elementary school or junior high school can take classes about food. During the late afternoon, children from the Boys and Girls Club of America come to the site for afterschool activities. They can do various types of work according to their ages, such as pruning, watering, and harvesting. Staff from Seattle Community Farm or Beacon Food Forest might be able to help them out. During the night, local residents can rent the community greenhouse and hold parties. The place also accommodates activities such as Tai Chi Chuan and Yoga. More and more people would come to the hill on weekends. For instance, local residents could explore the forage forest and garden and observe wild animals and birds. Some of them might be just interested in looking at unusual plants such as rice and various species of herbs. People who live in Seattle might be interested in cultivation and participate in volunteer activities. Since the site is

close to the light rail station, it has the potential to draw a large number of people from outside of the neighborhood.

The hill expands the influence of activities (Fig. 4-20). During planting and harvesting seasons, students from Hawthorne and John Muir Elementary School can help plant and harvest as a part of their education. Collaborating with Rainier Community Center and Rainier Vista Neighborhood house, the hill is able to own community gardens, similar to a p-patch. Mercer Middle School students can go to the site to learn how to grow plants. Franklin High School students can learn how to run an agri-business, and help manage the hill. There is VA Medical Center to the west of the hill. The center can obtain medicinal plants at the herb garden and also take patients to the site for the purpose of rehabilitation or therapy. Rainier Valley Food Bank is, as I mentioned before, a good place for donating vegetables and fruit. However, if the staff or volunteers at the hill need a budget to run the site, they can sell fresh products to Safeway or open a shop at Columbia City Farmers Market.

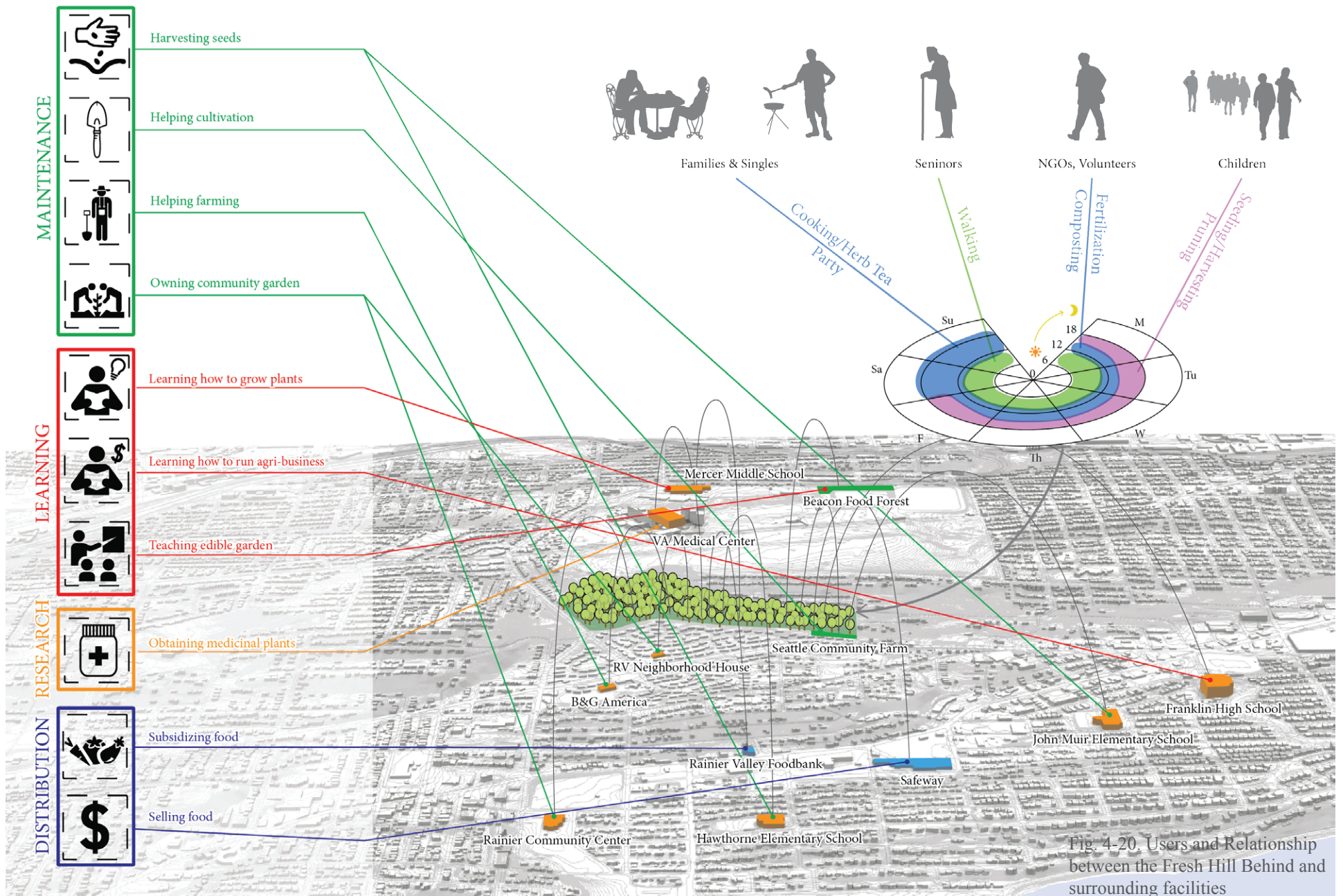


Fig. 4-20. Users and Relationship between the Fresh Hill Behind and surrounding facilities

Fresh hill as urban food infrastructure

With the planned activities and design features, the proposed site will no longer be just a hill. Building upon its initial cultivation, Fresh Hill Behind can expand to a larger scale. Educational institutions would be invited to join with the project to provide opportunities for students to learn more about local food systems and engage in cultivation and maintenance.

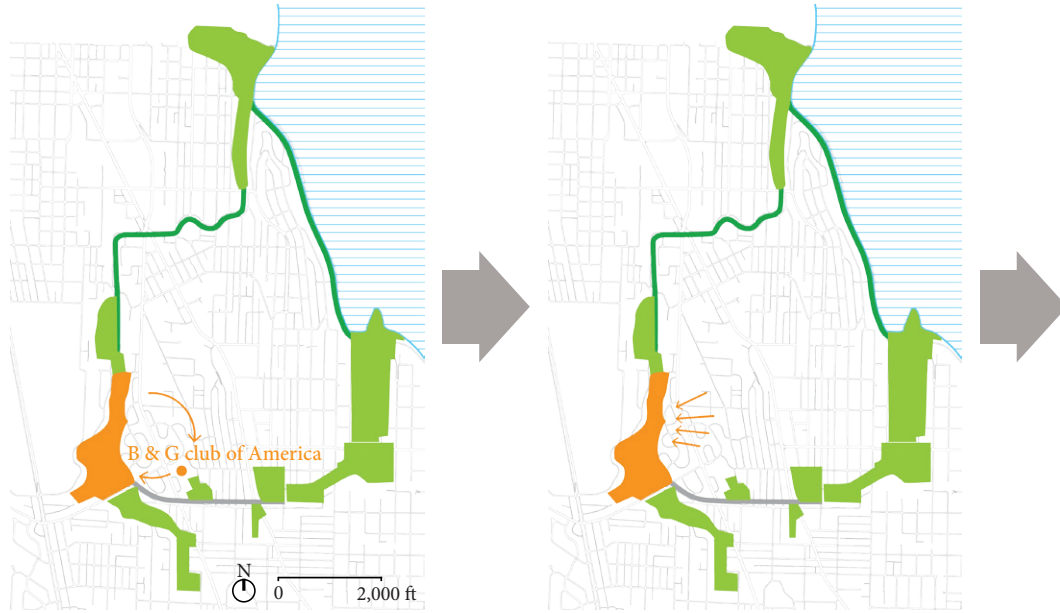
Close to the proposed site, Boys and Girls Club of America offers various after school programs and wants to have a class in which students can learn about nature (Fig. 4-21). It is possible that students from the club help with cultivation as a class of learning about nature. In addition, there are a wide range of students in the school. Each student could pursue work that appeals to them. For instance, elementary school students could help planting, weeding, and harvesting. Middle school students could have more assigned works like maintaining rice field, or putting fertilizer on the orchard and herb garden. High school students could help prune away offshoots of fruit trees or design/build structures such as trellis and greenhouse.

Along with the active participation of students, the site could be more open to the public and local residents could participate in activities. It would

depend on local residents, but I hope many of them would participate in the activities.

If trial projects are successful, the relationship between the hill and educational facilities could be expanded to other sites, such as Franklin High School and the hill in Mount Baker Park, and Hawthorne Elementary School and the hill in Genesee Park. In these cases, these educational facilities have less variety of ages than Boys and Girls Club of America. However, it is possible to pursue more limited intervention. In the case of Franklin High School, they could manage the hill by soliciting funds and volunteers. If some of the students have already worked at the Fresh Hill Behind, they could teach other students how to run the hill and cultivate the land. In the case of Hawthorne Elementary School, the students would be too young to manage every aspect of the work needed to cultivate the hill. Thus, they could just create an area where they could grow vegetables and herbs. Their parents might be able to work with them. If it is possible, both students and their parents could learn more about fresh food.

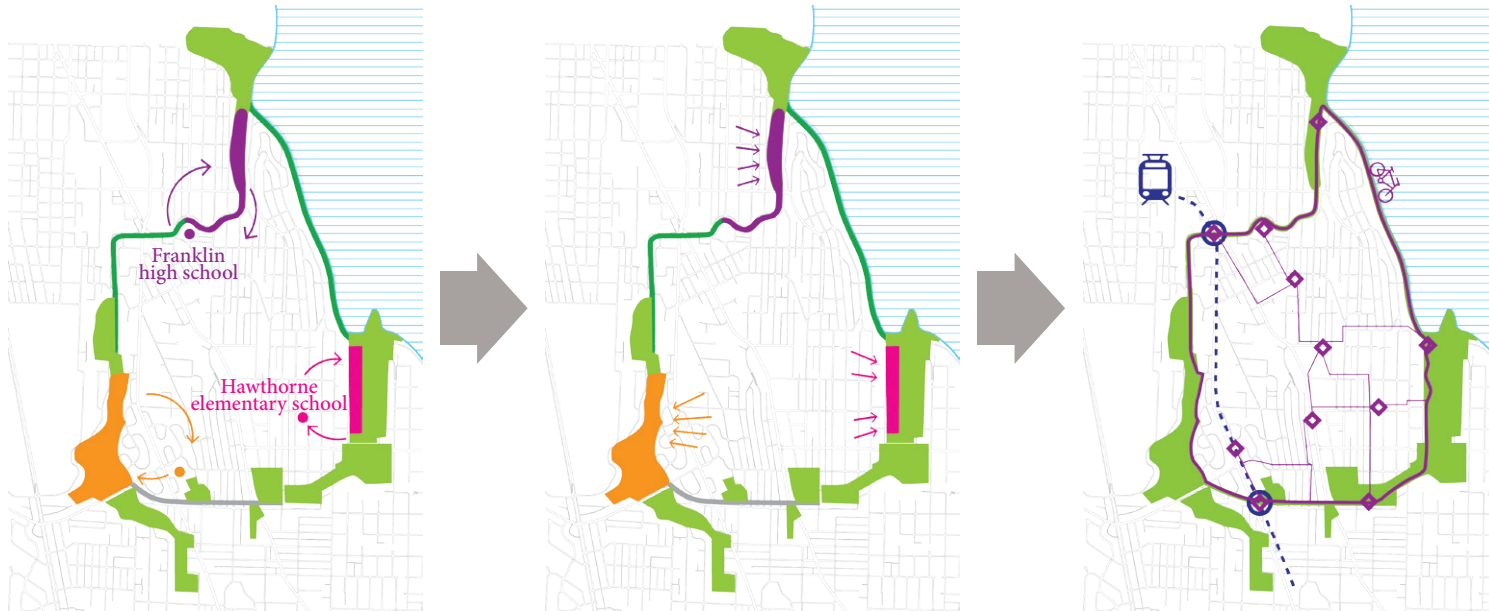
This expanded cultivation might also influence adjacent communities. People who live in these communities could learn from each other and do supplemental work that the students there cannot do. For instance, students from Hawthorne Elementary School cannot work with fruit trees or rice fields,



1. Take students of B&G club to the site

2. Involve a local community in

Fig. 4-21. Community participation in chronological order



3. Find another sites and align with educational institutions

4. Involve local communities in

5. Connect food learning sites and food facilities

because such work need high maintenance and specific skills. If connected to the community, the hill in Genesee Park could be cultivated with help of local residents.

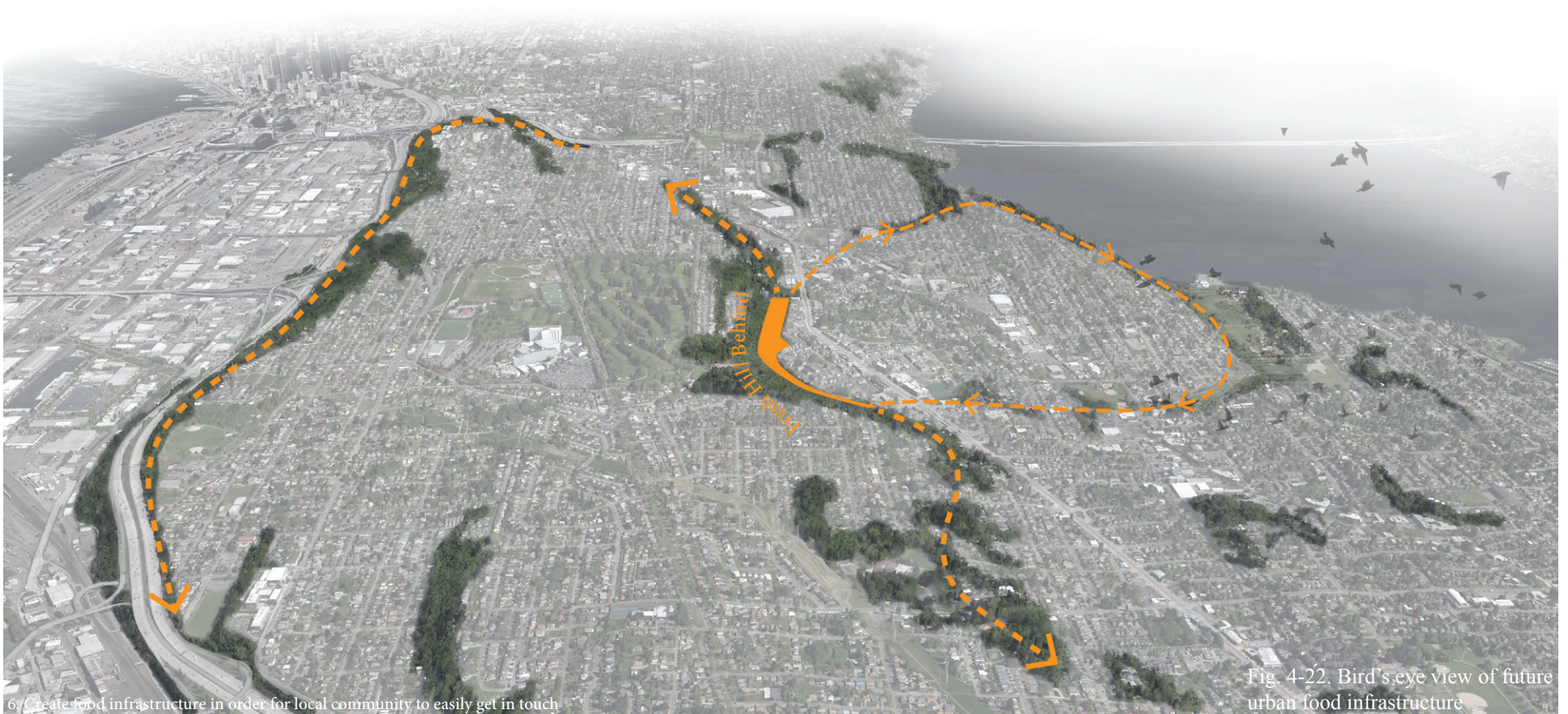
After the expansive cultivation of the hill, a large number of vegetables, fruit, and herbs could be harvested. As these hills need to be connected, paths can be created to link with the hills. Cheasty and Lake Washington Boulevards have already exists as paths. Enhancing the road, as a fresh road, where fresh buses and fresh bikes as well as pedestrians can travel, would allow more convenient supply of fresh food for locals. Those fresh vegetables, fruit, and herbs would be supplied to facilities such as Safeway, Rainier Valley Food Bank, and various educational institutions.

The design process can be applied to other hills in the city, allowing them to be connected with each other, and creating a large corridor of urban food infrastructure (Fig. 4-22). Especially in the south of Seattle, there are substantial amount of similar hills due to glacial erosion. Some of the hills are protected from the Olmsted Brothers Plan and City of Seattle. Local NPOs are trying to restore the hills to the original ecological state of West Washington³⁴. The plan calls for designing a trail in the hills and replacing invasive and deciduous plants with native plants. I think some parts of the plan are beneficial for

both ecology and community. However, response to global climate change, I think some of the deciduous trees should be protected. Those deciduous trees turn bright red, which makes the community more beautiful. My proposal could be combined with the city's plan. Deciduous trees could be protected and planted only along the base of the hills, so that the hills could become more ecologically, seasonally, and culturally diverse.

As a result of serial cultivation, more and more people would become acquainted with the whole local food system. Once people would care about what they eat more than before, they may take more time to cook even though they are busy with their jobs. They may also become more interested in ecosystems through foraging, seasonal transitions through seasonal fresh harvests, and cultural diversity through growing cultural food. They would become implicitly educated through the process of cultivation of food in the hills. Such lessons from the hills would be shared through urban food infrastructure. In the end, the infrastructure would contribute to the desegregation of the local food system and foster a healthier relationship between city and nature.

³⁴ Friends of Cheasty Greenspace at Mt. View, <http://www.cheastymt-view.com/>, cited 29 May 2015



6. Create food infrastructure in order for local community to easily get in touch

Fig. 4-22. Bird's eye view of future urban food infrastructure

5. Conclusion

Due to the many problems related to food in the United States such as increasing numbers of fast food restaurants and relatively less time that people spend cooking, I hypothesized that the segregation of local food systems occurs in the United States. To reduce the segregation of local food systems, I proposed Fresh Hill Behind as a model project, which could be applied not only in the proposed site, but also on other hills in Seattle. The proposed hill is expected to generate three outcomes. First, local residents are able to obtain wide ranges of knowledge about food. Second, local residents are able to learn what is fresh food and spend more time to cook healthy food. Third, the placemaking process on the hill can contribute to community building. I assume that people who live close to the proposed site are involved in food education, and that the proposed site generates interaction among people regardless of social status.

Based on lessons from the literature review, I created a series of cultivated areas that are related to food: forage forest, forage garden, terraced rice field, orchard, herb garden, and community greenhouse. As a part of Continuous Productive Urban Landscape in the neighborhood, this series of cultivated areas contributes to the improvement of the surrounding environment, while providing food for the community. A half-mile long trail on the site helps promote people's behavior such as walking and jogging.

The intervention on the site can be compared to Satoyama. Only the strip of the hill is cultivated in Satoyama and the cultivated site offers various types of learning opportunities for nature as well as just producing rice, vegetables, fruit, and so on. The intervention is adaptive to natural condition, and has a wide variety of places. In such places, there is space for local people to intervene as they like, bringing cultural diversity to the site.

Fresh Hill Behind can enhance the perception of ecosystems, seasonality, and diverse culture. Specifically, forage forest and forage garden offer an opportunity of observing various types of wild animals, birds, and insects through forage. In the forage garden, visitors are able to watch wildlife species from many angles. These experiences make people more sensitive to ecosystems. Visitors can

feel distinctive seasonal transitions on the hill. Terraced rice field and orchard, in particular, change according to the season. Interventions are undertaken by many organizations such as Boys and Girls Club of America. Local residents are able to experience a transitional landscape.

Fresh Hill Behind will no longer be just a hill. After initial cultivation, it can expand to a larger scale. Educational institutions such as Boys and Girls Club of America, Howthorne Elementary School, and Franklin High School with connections to nearby hills will help with cultivation. At a larger scale, more and more local facilities and organizations could be encouraged to be involved in the works. Since the process can be applied to other hills in the city, a large corridor of urban food infrastructure can be created. Eventually, the infrastructure will contribute to the desegregation of the local food system and foster a healthier relationship between city and nature.

The proposed model can influence neighborhoods near Fresh Hill Behind and extended food infrastructure. Such influences could improve people's awareness of the food interconnections of ecosystems, seasonality, and cultural diversity.

Several topics merit further consideration. First, sustainability should be considered in project implementation. The idea of urban sustainable farms

is common among scholars studying food system science. Sage (2011) suggests that a sustainable food system has to yield optimal agricultural output without compromising the stock of natural resources and ecosystem services³⁵. In my proposal, I did not calculate indicators relating to sustainability. Leach et.al. (2010) suggests that sustainability has to have explicit indicators such as the quality of human well being, economic justice, and ecological integrity³⁶. If sustainability is successfully measured, it is easier to persuade stakeholders and invite local residents to participate.

Second, who starts the design should be considered thoroughly. Usually, food security initiatives are led by public entities rather than private initiatives. Even when local residents facilitate the cultivation. In Seattle, there are several community farms open to the public, and most of them are run by NPOs. In *Insurgent Public Space* edited by Hou, Marra Farm is exemplified as the case of urban farm³⁷. The farm was originally owned by Marra family. When the farm was sold to King County in 1970, some of the locals wanted to maintain its agricultural production, so the land was purchased with funds from the Open Space Bond in the 1990s. This example shows that it is possible that local people could contribute funds to Fresh Hill Behind and manage it on their own, once the project is going well. It would probably take a long time, but envisioning a long future is one of the

³⁵ Sage, C. (2011). *Environment and food*. London: Routledge.

³⁶ Leach, M., Scoones, I., & Stirling, A. (2010). *Dynamic sustainabilities: Technology, environment, social justice*. London: Earthscan.

³⁷ Hou, J. (2010). *Insurgent public space: Guerrilla urbanism and the remaking of contemporary cities*. Chapter 20, *Urban agriculture in the making of insurgent spaces in Los Angeles and Seattle*. New York: Routledge. pp. 227-240

professions in landscape architects.

Third, ecological processes should be considered in more detail. In actuality, ecosystems are much more complicated than my proposal suggests. Planting plans should be considered in chronological order because the site is so huge that demolishing too many trees at the same time will deteriorate the quality of the number of ecology. With the extent of development, native trees are also of importance. By planting most of the native trees especially in forage forest and garden areas, the potential ecological capacity on the site will emerge. Such capacity enhances the potential of nature in the neighborhood and builds a sound relationship between urban and natural systems.

Bibliography

Books, Articles, and academic paper

- Allen, S. 'Infrastructural Urbanism, Performance Notations: Barcelona ZAL,' *Scroope* 9, (1996): 71-79
- Bohn, K., & Viljoen, A. (2011). The edible city: Envisioning the continuous productive urban landscape (CPUL). *FIELD*, 4(1), 149-161.
- Corrigan, M. P., & Local Food Systems and the Applied Geography of Food. (October 01, 2011). Growing what you eat: Developing community gardens in Baltimore, Maryland. *Applied Geography*, 31, 4, 1232-1241.
- Drewnowski, A., Rehm, C. D., Moudon, A. V., & Arterburn, D. (2014). The Geography of Diabetes by Census Tract in a Large Sample of Insured Adults in King County, Washington, 2005–2006. *Preventing Chronic Disease*, 11, E125. doi:10.5888/pcd11.140135
- Falk, B. (2013). *The resilient farm and homestead: An innovative permaculture and whole systems design approach*. White River Junction, Vt: Chelsea Green Pub.
- Gibson, D. (2003). Food stamp program participation is positively related to obesity in low income women. *The Journal of nutrition*, 133(7), 2225-2231.
- Hamm, M., & Bellows, A. (January 01, 2003). Community Food Security and Nutrition Educators. *Journal of Nutrition Education and Behavior*, 35, 1, 37-43.
- Hou, J. (2010). Insurgent public space: Guerrilla urbanism and the remaking of contemporary cities. Chapter 20, *Urban agriculture in the making of insurgent spaces in Los Angeles and Seattle*. New York: Routledge. pp. 227-240
- Hurvitz, P. M., Moudon, A. V., Rehm, C. D., Streichert, L. C., & Drewnowski, A. (2009). Arterial roads and area socioeconomic status are predictors of fast food restaurant density in King County, WA. *The International Journal of Behavioral Nutrition and Physical Activity*, 6, 46. doi:10.1186/1479-5868-6-46
- King, Nigel (1994) *The qualitative research interview*. In: *Qualitative methods in organizational research: a practical guide*. Los Angeles: Sage.
- Leach, M., Scoones, I., & Stirling, A. (2010). *Dynamic sustainabilities: Technology, environment, social justice*. London: Earthscan.
- Mathis Wackernagel, and William Rees, *Our Ecological Footprint: Reducing Human Impact on the Earth*, (Canada: New Society Publishers, 1996).

- Makoto Yokohari, *Process Architecture 127: Ecological Landscape Planning*, (Tokyo, Japan: Process Architecture Co, 1995).
- Medeiros, L. C., Hillers, V. N., Kendall, P. A., & Mason, A. (2001). Food safety education: what should we be teaching to consumers?. *Journal of Nutrition Education*, 33(2), 108-113.
- Organisation for Economic Co-operation and Development. (2011). *Society at a glance 2011: OECD social indicators*. Paris: OECD.
- Robson, C. (2002). *Real world research: A resource for social scientists and practitioner-researchers*. Ch. 9: "Interviews." Oxford, UK: Blackwell Publishers. In *Real World Research*.
- Sage, C. (2011). *Environment and food*. London: Routledge.
- Sobel, D. (2004). Place-based education: Connecting classroom and community. *Nature and Listening*, 4.
- Takeuchi, K., Washitani, I., & Tsunekawa, A. (2001). *Satoyama no kankyogaku*. Tokyo: Tokyo Daigaku Shuppankai.
- United States Department of Agriculture. (2014) *USDA Year Book*, <http://www.ers.usda.gov/data-products/us-food-imports.aspx>, cited 11 June, 2015
- Winne M, Joseph H, Fisher A. *Community Food Security: A Guide to Concept, Design, and Implementation*. Venice, Calif: Community Food Security Coalition; 2000.
- Woodhouse, J. (2001). "Over the River and Through the 'Hood': Re-viewing 'Place' as a Focus of Pedagogy." *Thresholds in Education*, 27 (3 & 4), 1-5.
- Yamamoto, S. (2001). A study on transition of the structure of landscape and vegetation in Satochi, Report of National Institute for Agro-environment sciences(20). pp.1-105

Websites

- Beacon Food Forest in Seattle, <http://www.beaconfoodforest.org/>, cited 29 May 2015
- City data, Seattle, <http://www.city-data.com/income/income-Seattle-Washington.html>, cited 29 May 2015
- Definition of lifestyle disease, <http://www.medicinenet.com/script/main/art.asp?articlekey=38316>, cited 11 June, 2015
- Friends of Cheasty Greenspace at Mt. View, <http://www.cheastymtview.com/>, cited 29 May 2015
- The Fresh Stop Bus, <http://www.thefreshstopbus.com/>, cited 29 May 2015
- Google Earth, <https://www.google.com/earth/>, 47.563609, -122.296890, cited 29 May 2015
- Rainier Vista - Seattle Housing Authority, <https://www.seattlehousing.org/redevelopment/rainier-vista/>, cited 29 May 2015
- Seattle Youth Garden Works – Seattle Tilth, <http://www.seattletilth.org>, cited 29 May 2015
- The Fresh Stop Bus, <http://www.thefreshstopbus.com/>, cited 29 May 2015
- Washington State Geospatial Data Archive, https://wagda.lib.washington.edu/data/geography/wa_cities/seattle/index.html, access restricted to UW staff, faculty, and student, cited 29 May 2015

Appendix: Result of Interviews

List of questions for Scott Behmer @ Seattle Community Farm

1-1. What is Seattle Community Farm's main role? Do you maintain the community garden? Or local residents who have their own plots usually do? Is it competitive for local residents to get their own garden plots? Are there prioritized plots for low-income people?

Nobody has their own parcels. It's a sort of community garden totally. Volunteers and Scott take care of the farm.

1-2. Have you ever held local events such as a harvest festival?

There is a communal space in the farm, so volunteer people sometimes use the space. Scott personally want local residents to use the space more, but it is rare right now. Budget to build the communal space was donated from private company and JAS company designed and built pavilions as a volunteer. Scott holds some events, but they are usually for volunteers. He wants to invite local people but they are not coming.

1-3. Does your farm operate some programs regarding to nutritional education?

During summer, he offers summer programs for children such as cooking, seeding, and nutritional learning. Usually children come from B&G Club and refugee alliance.

1-4. Where do volunteers basically come from? In running your farm, are you considering the aspect of cultural diverse of residents?

He can get enough volunteers to have his work done, but he wants more volunteers. Volunteers are usually groups of people and come from neighborhood, school children, and companies as a social service. He wants to invite more residents in the neighborhood, but they are not positive about the work. Since volunteers come as a group, they are not so much culturally diverse, but Scott considers the aspect and a flyer to collect volunteers are written in various languages.

1-5. Would you have some problems regarding to the community farm such as storm water treatment or collecting volunteers? I'm thinking of expanding communal farmland and orchard mainly for educational purpose of nutrition. Would you have some suggestions for community's needs for public space? What do they want?

For stormwater treatment, the farm has to deal with it because there is a hill behind and the soil there is heavy clay soil. Therefore, they have a small rain garden on the edge of the farm. It is good for me to think of some programs using community garden, but I have to consider who teach the programs.

1-6. Others

In winter, they plant winter crop to hold nutrient such as nitrogen. Each year, 6,000-10,000 pounds of vegetables are harvested, and a lot of vegetables go to the food bank. They offer work trade program. By joining the program, participants can get vegetables from the farm. There is a feedback system in terms of selection of vegetables. When they offer vegetables to the food bank, it reflects the receivers' need. Receivers at food bank actually have a preference for vegetables, but it is sometimes hard to offer the vegetable that they like. For example, hot pepper and banana grows only in a tropical climate.

List of questions for Jacqueline Cramer @ Co-Founder of Beacon Food Forest and Educator for permaculture garden

2-1. Do you actually provide the class about permaculture gardens?

She is going to have the class by June, 2015.

2-2. What kind of people comes to the class? Neighbor? Low-income people?

She will teach the idea of permaculture and where to plant trees, shrubs, and grass. This is the class for the local community. Income level is mixed. She wants participants to use the technique for their own gardens.

2-3. I'm interested to encourage young teens to join such classes. Does your class have any relation to children such as students at Mercer middle school?

She has had classes at elementary schools and high schools. Since her project is famous, she is invited to lecture at schools.
Also, there are some products students made in the garden. Seems that they are really connected.

2-4. Why did you decide on Beacon Hill for permaculture garden?

Glenn, who is co-founder of Beacon Food Forest, is a local person at Beacon Hill, so that they decided to do the job there. His idea is originally to make an arboretum, so by employing the idea of permaculture, they set out the project.

2-5. The landowner at Jefferson Park is the City of Seattle, right? So do you rent the land from the city?

Yes, they rent part of Jefferson Park from Seattle Public Utilities. The cost is very cheap, that is \$200-300/year.

2-6. When you plan planting plan there, did you consider each species, like where to plant and what to plant? I'd like to ask the strategy of planting plan there. (Everything is edible plants?)

Yes, according the idea of planting zoning used in permaculture gardens, they decide on plants. They actually have a planting plan.

2-7. How do you maintain the garden? With volunteers? A lot of work is needed for maintaining the garden?

Volunteers come once a month, and the number of volunteers is huge. 100-120 people come as volunteers. She usually makes groups such as digging, seeding, or planting.

2-8. Others

- You can have your own p-patch. It cost you \$40/year and 8 hours/year of volunteer time is required.
- For educational purpose, they have two types of planting zones. One is mixed planting, which inherit the idea of permaculture. The other is simplex planting as a showcase for individual plants. By doing so, visitors can learn each plant rather than seeing complex planting system.
- They grow mushrooms such as Shitake and Maitake.

