Agroecological Farm Design Using Popular Education

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Foreword

This report fulfills the final project requirements of the Masters in Environmental Studies Program at York University. It reflects an accumulation of learning and research throughout my masters program which is outlined in my Plan of Study document. All three components of my Plan of Study have informed this project, however due to the scope of the project, this project emphasised the learning objectives related to community farms, natural education, innovative green business and resilient organizational structures.

With regards to community farms the Cavaleiro Farm design was approached as a multifunctional design with a strong patterning of environmental, social and economic layers of thinking. Natural education was explored through the development of the workshops and format for visitors to the farm. The innovative green business objective was an overarching theme to this design process because it plays such a large role in making the Cavaleiro Farm project viable. Resilient organizational structures were very much reflected in the social component of this research which of course is strongly interdependent with environment and business development for the project.

Food systems, agroecology, food sovereignty and the complexity of our relationship with food have informed this final project. Specifically, various case studies, examples from working farms, as well as experiences interacting with others in the sector have been invaluable in informing this project as Cavaleiro Farm, where the project took place, is a real farm with real people.

Learning organizations, particularly through the lens of systems-thinking and organizational ecology were the research areas that interested me throughout my masters' work. The mechanics of how people work together on food projects and understanding how we come together through food in a non-hierarchical structure has been important since the beginning of the project. As a response to the profit-focused global food model, this project presents an opportunity to rebuild the local food system. Additionally, based on my work here, I believe that a democratically controlled local food system is the direction we have to go if we want to avoid similar profit-focused food in the future.

Finally, triple bottom line business is a bridge between this capitalistic, profit-focused food system and the sustainable, accessible food system we are trying to build. Our current western world has been hijacked politically, socially and environmentally by a dominant class of the super-rich who over decades have accumulated more wealth at the cost of ecological and social damage. Farming and triple bottom line business presents an opportunity to rebuild without completely destroying the past foundations of modern civilization.

Acknowledgments

I would like to acknowledge all the fellow class mates that went on this journey with me through the MES program. The discussions, shared experiences and the learning supported by us being together was the most valuable part of my education. To the professors who shared their life experience and especially those professors who taught part-time or on contract, your enthusiasm for learning was contagious.

Thank you to all the people who directly supported this project through visits to the farm, discussions around the campfire and most importantly the interacting with plants and animals that feed our body, minds and soul. In particularly I would like to thank and acknowledge my parents, Dina and Jose Gomes, who after years of listening to me talk about reconnecting our family to farmland invested in farm land in Canada to begin this project.

Special thanks to Samantha Saunders for all the encouragement and edits throughout the MES program. Phil Collins was my collaborator on the mushroom workshops. Damian Adjodha who took me on my first agroecological walks through the forest and introduced me to the popular education connection. Thanks to Rod Mac Rae who encouraged food systems-thinking throughout my masters program as well as agroecology.

Finally thank you to Chris Cavanagh for supervising this project and all the support on popular education. I will need the next ten years to go through all the materials that were shared while learning about popular education.

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Section 1: Context and an Introduction to Cavaleiro Farm

Cavaleiro Farm presents an opportunity to create a village of activity around a sustainable farming project just outside the Greater Toronto Area. For my family, Cavaleiro Farm is an investment opportunity with a chance to reconnect with the rural lifestyle from our families recent past. For the farmers that will be growing good food at Cavaleiro Farm, the farm represents an opportunity to build equity in farming without landownership while also developing their potential to move onto greater farming projects. For the engineers and skilled laborers involved in the project, the farm offers an opportunity to develop decentralized sustainable systems for people in their community. Collectively this farm is an opportunity to grow healthy seasonal food year round while creating a stronger connection to nature.

Cavaleiro Farm manifested as a result of the years of social capital that was not only built with my parents but also farmers, engineers and friends. Without the support of so many individuals the project could not be what it is and certainly we would not be able to achieve its intended vision. The farm is located in the Greater Toronto Area just north of Vaughan in a town called Schomberg. This rural setting, so close to urban centers, provides the opportunity for a diverse set of farming businesses to operate. By recognizing a diversity of exchanges, not just focused on capitalistic exchanges, we open up local food to its full potential for positive environmental, social and business impacts.

How this all comes together in the making of Cavaleiro Farm is through the building of a farming model which keeps the land under private landownership, while allowing a farmers collective to the flexibility to develop a productive farm that also rewards farmers with equity. These objectives are met through the building of community economies and the realization of our potential to have impacts on the not only the food we eat but the quality of life we share.

For the purpose of this final research project I applied popular education methods and perspectives as part of agroecological farm design process. To begin, here are working definitions for popular education, agroecology and systems thinking which can get us going on the journey. These definitions will be explored further in the project and linked to other references.

Popular Education – loving form of education which strongly promotes democratic, participatory and dialogic process with the goal of conscientisation.

Agroecology – the design of agro-ecosystems through the strategy of diversification. Mimicking natural ecosystems to inform the design of sustainable cropping systems the 'challenge is to discover the most efficient crop, tree, and animal combinations that match the environmental potential of each area' (Funes, etc. pg XIII)

Systems-Thinking – is a 'way of thinking that gives us the freedom to identify root causes of problems and see the opportunities' (Meadows, pg 2)

This research topic is the accumulation of my research in the Masters in Environmental Studies at York University, and can best be situated by understanding the circumstances that brought me to the program. I began my professional career as a mechanical engineer in robotics, race cars and software programming before moving to integrated food growing systems for urban environments in 2009.

The experience of growing dozens of food crops year round using low-cost organic production methods had made it evident that food is much more complicated than simply more sustainable means of food production. There are powerful social, cultural dynamics at play. As Sally Miller discussed in **Edible Action: Food Activism and Alternative Economics** with regards to the first green revolution in the 1960's, agricultural systems cannot be transformed "without affecting social systems". (Miller, pg 23) My experience of localising my food system effort had as much to do with changing food consumption

patterns as with production methods. Especially challenging was the social side of food in that eating with others often brought me back to previous food patterns. Food is a shared experience especially from the systemic perspective in Canada where the oligarchies of food companies create thousands of ways to feed us the same handful of industrial crops.

I began MES using a systems-thinking lens to guide my research in the program because it provided a way to understand these complex interactions with food and thus improve my ability to design sustainable food systems. The systems-thinking lens is the method through which I approach food system design and holistic decision-making. Indeed it is 'a system (that) is more than the sum of the parts. It may exhibit adaptive, dynamic, goal-seeking, self-preserving and sometime evolutionary behavior' (Meadows, pg 13).

Systems-thinking understands systems as made of three potential areas: elements, interconnections, and a function or purpose. As our food system is very complex and the systems-thinking lens creates a framework for managing/understanding such complexity which then, in turn, gives me the ability to understand change.

Two years ago I founded an engineering integration company, Urban Crops, which develops local food technologies. Urban Crops is currently implementing infrastructure for sustainable farming on Cavaleiro Farm. We are designing a multiyear strategy and a business model as well as leveraging project management techniques to ramp up the farm which is scheduled to open in Spring 2015. The goal is to handoff the farming operations on the farm to a cooperative-like farming group while maintaining the current private landownership model. Final research took place from Jan 2014 to July 2014 during the earlier phase of the agroecological design. Undoubtedly it will take years of work to further unravel the positive impacts of popular education at Cavaleiro Farm.

Keeping with a systems thinking lens, popular education and agroecology have many similarities in function or purpose. Both encourage a holistic perspective which sees the interconnectedness of the world, functioning to bring awareness of complexity, connection and interrelations. While popular education recognizes individual histories of individuals in relation to their voices and knowledge, agroecology recognizes the uniqueness of sites where design involves understanding the history of place. Both agroecology and popular education thus seem to have a common purpose encouraging solidarity.

Agroecology and popular education are also both very much a part of the global food social movement. Miller notes that the 'most interesting movements for social change around food incorporate popular education initiatives' (Miller, pg 173.) La Via Campesina promotes popular education in its organization and we can get some glimpse of what that means from the format of its 'Fourth Conference (which) began with one of the regions communicating their history, peasant roots, and/or current struggles through theatre, dance, or song. (Desmarais, pg 188). La Via Campesina also promotes agroecology as the alternative agricultural paradigm moving towards decentralization, independence, community, harmony with nature, diversity and restraint. (Desmarais, adapted from Beckie, pg 69). La Via Campesina, as a diverse international organization of farmers, incorporates both agroecology and popular education.

Popular education in food activism often promotes the use of 'participatory and dialogic process' (Miller, pg 172). In a comparable fashion, agroecology promotes participation and a dialogic process with nature. Where the elements of the system might be different, the type of interaction encouraged by both is quite similar and we can extrapolate that agroecology and popular education both are encouraging similar purposes with participation and dialogic process.

While popular education creates juxtaposition between teacher and learner, in agroecology the farmer learns from nature while also varieties adapt (learn) to the farmer. This juxtaposition is humbling and leads to respectful ways of interacting. The patterns associated with these types of interactions, which are very horizontal as opposed to hierarchal, lend themselves well to farmers collective. This basis informs the collective process of learning which is promoted by popular education. In parallel, agroecology promotes learning from nature which is a commons of knowledge, thus available to all to collectively learn from.

Agroecology develops unique food system designs to a specific location and set of social conditions which encourages diversity, solidarity and overall food system resilience. Popular education promotes personal and social transformation which has a similar outcome of encouraging diversity, solidarity and resilience in people. Agroecology has developed broad research and practices towards food systems and while it does acknowledge social change, I believe popular education can contribute to the social aspect of agroecology.

The major challenge towards achieving an agroecological food system is the social and cultural aspects that are so interwoven with food that need to change in conjunction with production methods. From a practical point of view that change will come about much quicker if this change comes from people as a whole, after all, we eat and interact with what is the food system. To this end we need to people to move from spectators to spectACTORS, people who actively shape their food system. In the wake of a globalized food system, a localized food system is going to be the environment for this personal food transformation.

1.1 Popular Education

Defining popular education becomes elusive as it includes a range of principles and themes which can be adapted according to context. Popular education is a radical form of education that strongly promotes democratic process, and as mentioned above, has goals of participatory and dialogic process. Miller defined popular education as an ongoing 'consciousness-raising' way to organizing. It shifts the emphasis from organizing for single events to organizing a group of isolated individuals into a collective of people committed to acting together for justice of which Miller remarked, 'this kind of education seeks not just moments of democracy, but a time for democracy'(Miller, pg 123).

Flowers believes that the 'idea of education *by* people and *with* people takes on significant meaning' in comparison to education for people in a top-down form (Flowers, pg 2). According to Flowers research, popular education has roots in working class education in the eighteenth and nineteenth centuries, progressive and radical education, adult education and Freire's pedagogy of the oppressed. With these roots in mind, I will focus on the aspects of popular education that can be applied to both Cavaleiro Farm and agroecology in the broader sense. These roots of popular education inform the new growth of popular education, while the ambiguity adds adaptablity to popular education and allows us to name it.

Flowers writes about David Williams in the mid 18th century. Willams was already pioneering ideas that have now informed Cavaleiro Farms programming; experience-based learning, democratic and participatory learning, peer learning and project- based learning (Flowers, pg 6). The debate over educator versus facilitator was also part of this early development in popular education. The facilitator role is of more interest to Cavaleiro Farm as opposed to the more hierarchical educator role mainly because agroecology farming is so new that the idea of having an expert, which therefore in any sense

of the word becomes   limiting. There exists such a multitude of areas in farming with regard to agroecology, that an individual's experiences will form an expertise in something.

Adult education began by analyzing education for community versus democracy and according to Lindeman and Kotinsky adult education 'should not merely be about equipping people with skills and knowledge to participate more effectively in community affairs, but that education should be about helping people plan and bring about social change' (Flowers, pg 16). This is relevant to Cavaleiro Farm because present-day farmers are faced with an array of challenges in every part of the farming life, thus programming to support social change by farmers is part of the service offering on Cavaleiro Farm. The community in this case is Cavaleiro Farms on the macro-scale in which as an organization we want to support developing both individual farmers and a collective community with a shared vision.

When Flowers describes Freire and his contribution to popular education he notes that often popular education is attributed to Paulo Freire because of his impacts on the space. Freire coined the term 'conscientisation' to describe the shift of learners 'from passivity to a critical and active awareness' (Flowers, pg 16). The concept of conscientisation is attractive not only because of its transformative capacity in individuals on a societal level but also with the intersection of conscientisation and developing a sustainable local food system. Miller comments that 'food is a vehicle to which people can become politicized' (Miller, pg 14) and further extension food is a vehicle to conscious thinking. The challenge of developing sustainable food systems is that the current corporately controlled food systems, which isn't sustainable, wants to maintain the current status quo. Current politics or culture is about someone else solving the problems and in this case farmers and consumers alike need to undergo conscientisation. Sustainable food systems necessitate a corresponding development of complimentary culture.

This transformation of conscientisation occurs when individuals cease seeing themselves as subjects of history and begin understanding themselves as objects in history. This seems to present one of the main challenges to overcome within popular education. Once individuals see themselves as objects, then correspondingly we have a new culture being produced. Food, I believe, gives people a little of that push towards subject awareness. Working with soil, planting, watering and harvesting food before transforming it through cooking brings awareness to the whole human food cycle. This intimate interaction with food becomes a daily reminder of the subjective nature of our world. Since education is often seen as something that takes place in institutions, our interaction with food often flies under the radar. Perhaps this potential for food and conscientisation is reflected in the outlawing of the Food Not Bombs movement in many cities across the US because it creates a space for food outside the capitalistic system of control.

Section 2.5 of this project report delves deeper into food sovereignty and the implications for Cavaleiro Farm. While we are on the topic of conscientisation it is relevant to consider food sovereignty because it addresses many of the social and political structures that impact our food system. Like popular education, food sovereignty encourages active democratic participation. When initially discussing the proposal for this project with supervisor Chris Cavanagh, I recall a part of the conversation about the challenges of "applying" popular education to a business organization such as a farm, even one which tried to balance the environmental, social and business bottom line. Thinking about design and how it often impacts many outside the design process, I thought that perhaps democratic participation would involve those impacted by the design in the process leading to more vitality in the growth of Cavaleiro Farm.

Popular education has impacted my design process through my own personal transformation as well as the way I approached agroecological design throughout the project. While working on this

project the theme of popular education was not directly communicated to stakeholders yet often it influenced interactions. As one of popular educations principles inform us, everything is connected, these interactions had significant impacts on design while not directly part of the design process. Explicitly popular education informed the three parts of this report, yet the personal transformation which clearly had impacts on design becomes less tangible to quantify.

Stakeholders reach beyond organizational boundaries as opposed to shareholders which are limited to the individuals which have legal control over organizations. Stakeholders for Cavaleiro Farm in the broad sense are any group of people which are affected by the organizations activities and the definition can change depending on what perspective we have. It was a topic that often came up in many of the business classes that I took in as part of the MES program. Using experience from the classes which included case studies, guest speakers from industry and consulting projects, I can place stakeholders on a continuum. At one end you would often find big businesses who view stakeholders as a risk to manage and on the other end there are organizations which are built upon stakeholder engagement.

From a designer perspective what I found attractive about this stakeholder participation was the potential to develop Cavaleiro Farm with the stakeholders for the stakeholders. In this way the design is not an imposition but becomes a part of all those involved. This inclusiveness increases the project's potential for success in that these efforts of engagement become the foundation to forming a farmer collective which will oversee farming on Cavaleiro Farm. If we continuing along the inclusive theme that stakeholders offers compared to shareholders leads to the diverse economy model which fits within many of the concepts of popular education. The diverse economy model or paradigm serves as the foundation to a more democratic economy which improves the rate of success in building a sustainable local food system at Cavaleiro Farm.

From the diverse economy premise, our economy is the outcome of the decisions we make and the actions we take. Diverse economy represents a theory which is critical of capitalocentrism and promotes a new way of seeing the economy. Community economies represent one application based on the diverse economy theory which focuses on understanding the diversity of economic relationships. Along the theme of historical subjects and objects, we as people participating in community economies have the ability to be more than just objects in the system but subjects which have control of our perceptions, outcomes and actions. Where the theory of diverse economies is anti-capitalist, community economies do have capitalistic portions which reflect the domination of capitalism throughout the world.

The current challenge is that most people are unaware of their subjective potential and instead are objects which are acted upon through the various systemic forces of the capitalistic economy. This objective system of can be better understood by Gramci's concept of hegemony, and his work leads to subjective awareness and diverse economic practice.

Gramci's concept of hegemony is an important theory for popular education which can inform the environmental grounding perspective to agroecological. Whereas dominant education promotes a one way of thinking or forces people to conform to hegemonic ways of thinking, popular education offers some resistance to this monoculture. When I first began my research in MES I was introduced to the following diagram:

A: Where business is the whole with social as a subset and environment as a subset of that
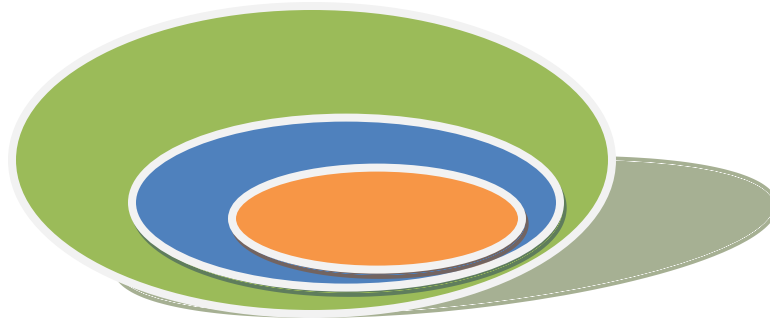

Orange (business) decides

Blue (social) patterns &

Green (the environment) is only as

B: Has environment as a whole with social as a subset and further business as a subset

The concept here is that we live in a paradigm where business has enclosed all aspects of life and the only parts of society and environment that fit within this paradigm are ones that can be part of capitalism. Paradigm B was suppose to be the more real paradigm, environment encapsulates all and within that society exists and within a society there is a component that is business. At first I viewed this as a dichotomy of either A or B, having them as separate paradigms that existed apart. A revelation was actually combining the paradigms and the concept of hegemony helps explain the resulting combined model which greatly informs our conventional agriculture and agroecology.

Diagram of A merged with B
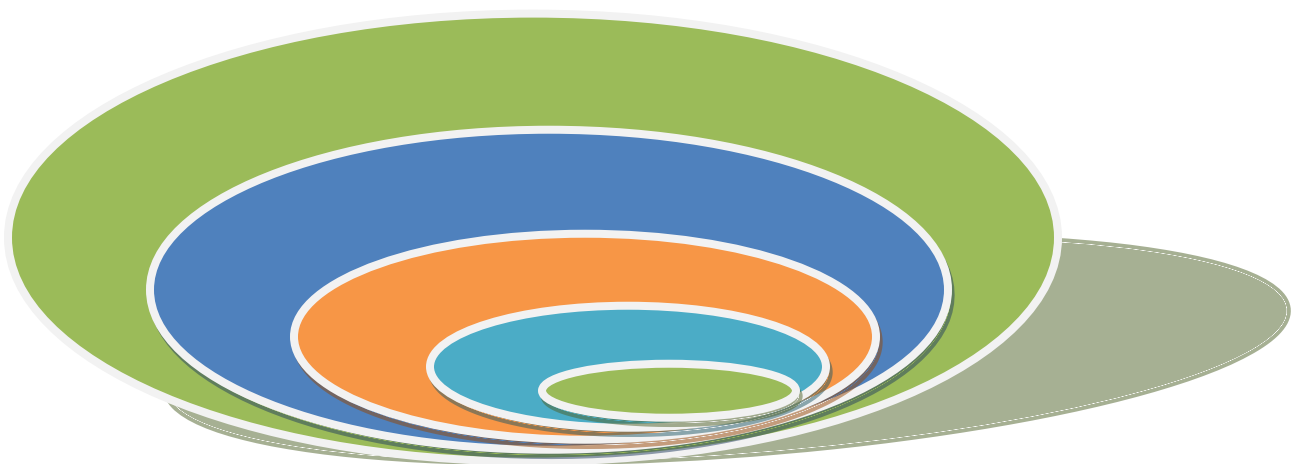
It is hegemony which has developed this capitalocentric model where business is a whole and only the portions of society and the environment which can be capitalized are accounted for (orange part of A merged with B). This paradigm resonates through conventional agriculture with centralized, technological dependent agriculture that has been removed from the farm and instead places the power in the hands of a few companies. This paradigm has grown over time along with the commoditization of food, which I theorize has also gone along with the separation of consumption of food and production. With this in mind, the outer social and environment in which we are all a subset of becomes less tangible, known and visible and at the same time the hegemony becomes stronger and more parts of our society become objects.

Hegemony grows stronger, yet the reality remains the same. Without society business would not exist and greater yet, without an environment the society cannot exists. Beyond the conventional agriculture paradigm exists the reality of a society which marginalizes and exploits farmers to keep the current system functioning g at great costs to the environment. Looking through the haze of hegemony, we also find that no matter how much the perceived progression of technology appears to bring us food, we find that it is the nature of the plants and animals that can interact with the environment to become food for us to eat. In the end, conventional agriculture, just like hegemony, continues to move forward under the guise of progression while hiding true costs from society and also by not allowing societies to see the forces at play. It takes a lot of effort to maintain this paradigm, of which the privileged and the exploited all buy into. Agroecology then, reframes food systems from the environmental perspective firstly thus reconnecting our food system with the true forces behind it.

The environmental sphere, with massive global cycles of water, nutrients, seasons and life is ever evolving and adapting to an interconnected system of complexity of which seven billion humans

make up just one fragment. Yet, we can have significant impacts. This is the context to the thousands of human cultures around the world with unique languages, cultures and histories which further add to the complexity and possibility. A common environmental theme in nature is that of diversity, which brings about the resilient capacity to earth yet is often not encouraged in conventional agriculture. This concept of diversity was a helpful tool for me to connect environment, society and business within agroecology because it allowed me to move between these spheres using analogs. The popular education concept of *diverse economy* organically encourages diverse interactions and ties in well with agroecological farm design, especially informing social organizing.

1.2 Diverse Economy

Our current western society has a strong tendency to value/ see the capitalocentric portions of the economy where other non-capital aspects are only as valuable as their potential to be converted into capital. There are various economic relationships that take place in our society related to such things as labour, enterprise, transactions, property, finance and consumption. My experience with local food projects has shown me that the diverse economy model is what makes these local food projects work. With food prices so depreciated because of cheap imports, the only way to make local food viable tends to be through non-capitalocentric means of exchange such as barter, volunteering, land trusts, cooperation, community bonds, etc.

Whereas the capitalistic portion of the economy is controlled at the top by bankers, corporations, elites and other forms of hegemonic controls, other portions of the diverse economy are open to more diverse players and contributors. The diverse economy model is perhaps most powerful because of its simplicity. It does not invent something new, it just presents the spectrum of economic activity in a way that allows us to understand how the economy as a whole fits together, bringing the margins into the light. Instead of the capitalocentric perspective, we are offered a broader perspective

which includes all the economic relationships that take place in society but are not necessarily appreciated because they do not translate into capital as readily.

Take Back the Economy: an Ethical Guide for Transforming Our Communities lifts the veil set by capitalistic patterns of economic relationships. This veil has been growing tighter in our society as capital has become necessary for every aspect of our daily survival. Take back the Economy was written for groups to use in developing community economies and thus informs many of the objectives of organizing on Cavaleiro Farm. The authors wrote the book 'believe(ing) that when people work in groups, their different ways of thinking and seeing are fertile ground for imaginative and creative work of taking back the economy" (Gibson-Graham, etc, pg xxi). Further, the book was "encouraged by the idea that we can build the economies we live in, individuals and communities across the globe are taking economic matters into their own hands to help create worlds that are socially and environmentally just" (Gibson-Graham, etc, pg xiii)

When we start to take back our economy we move from a passive space where the economy is seen as 'an ordered machine that governs our lives' (Gibson-Graham, etc, pg 1) to an economy which needs to be interacted with, changed and built to suit our needs. These spaces of interaction are community economies which in time build resilient networks serving broader social and environmental objectives as well as sustainable business objectives. Within community economies we can find many types of interaction, I believe a starting point is dialogue to which **Take Back the Economy** outlines a series of questions to ask ourselves about the type of life we want to have not only individually but as a society. (Gibson-Graham, pg xiii to xvii)

- What do we really need to live healthy lives both materially and psychically? How do we take other people and the planet into account when determining what's necessary for a healthy life? *How do we survive well?*

- What do we do with what is left over after we've met our survival needs? How do we make decisions about this excess? *How do we distribute surplus?*

- What types of relationships do we have with the people and environments that enable us to survive well? How much do we know about those who live in distant places and provide the inputs that we use to meet our needs? *How do we encounter others as we seek to survive well?*

- What materials and energy do we use up in the process of surviving well? *What do we consume?*

- How do we maintain, restore, and replenish the gifts of nature and intellect that all humans rely on? *How do we care for our commons?*

- How do we store and use our surplus and savings so that the planet are supported and sustained? *How do we invest for the future?*

These questions can take on many meanings depending on the community and the circumstances. The diverse economy theory is a major component of the agroecological farm design because it has two important outcomes. The first is that the diverse economy theory forms the basis of social organizing which is going to be needed to bring the necessary resources to Cavaleiro Farm. Secondly, Cavaleiro Farm itself provides a space where intimate interaction with these questions, not just conceptually or through experience, but being able to interact with a space where all these questions are present. In a way Cavaleiro Farm depends on community economies as much as community economies depend on farms like Cavaleiro.

Analyzing the capitalistic portion of the economy we find certain characteristics which give it advantages over other means of exchange and perhaps why it is so strongly encouraged by a hegemonic class. Capital is universal, thus it allows parties to exchange on equal terms without prior knowledge or

experiences between the parties. This universal exchange offers us great opportunities as a means of exchange because it is certainly efficient, but I think there are externalised costs which should be accounted for. We lose the need to form strong social relationships and accountability. We also lose the added values of economic relationships which cannot be converted into capital.

Creating the space for a diverse economy to function opens up the potential means of exchange and encourages the building of strong social relationships. The goal is to create a small economic village around Cavaleiro Farm which promotes this diverse economy formally. This involves formally accounting for all types of economic relationships, holistic accounting, so that all are put on an equal playing field towards positive farming outcomes. Holistic accounting ties in with environmental and social positive outcomes such as quality of life, means of production and culturally appropriate foods. Natural cycles, animals and plant relationships contribute to farm production also and fit within the diverse economy model. Diverse economy is part of holistic farming practices such as agroecology and eliminates externalized costs.

How does popular education inform the design of Cavaleiro Farm

For this report I have included these summary boxes which link important topics from this research to the agroecological design of Cavaleiro Farm. These summaries are organized by environment, social and business categories which formed a strong pattern of thinking throughout the agroecological design. Each point is a brief summary of the intersections. The purpose of these summaries is to serve the reader an insight into the actual Cavaleiro Farm design which was not covered in this report.

Popular education and the various principles it represents have many implications for successful agroecological design and the Cavaleiro Farm project in particular. Mostly it has informed the process of social development for the project. Here is a summary of design elements which reflect the integration of popular education principles.

Environment

- Challenging the current land stewardship models, the farm will not only look to promote more environmentally responsible food production systems but also create the space for people to interact with that system
- Expansion of habitat buffer spaces which are allowed to go through natural cycles, thus providing natural environment to reference and learn from
- Everything is connected, thus an environment where these interactions are encouraged such as edges of zones provide increased diversity and thus opportunities for observation
- The diverse habitats on the farm will lead to greater diversity which can then move outside Cavaleiro Farm
- Increased perennial production will sequester more CO_2 and improve the atmosphere while at the same time improving water quality and increasing water retention, improving part of the commons

Social

- Cavaleiro Farm will promote individual and social transformation by creating a culture of learning around types of food, how they are prepared and how we distribute those foods
- Promote a more democratic social structure which can distribute the surplus from the land
- Structure of daily events at the farm mirrors PRAXIS in that there are times for theorizing, acting on those theories and then collectively reflecting; repeating this cycle leads to the adaptability of the farmers collective by encouraging learning
- Work group structure on the farm encourages individuals to be teachers and learners, depending on the group, situation or task
- Modelling a village at Cavaleiro Farm should lead to an environment where diverse economic activity around food can happen

Business

- Use of the diverse economic model which recognizes economies outside the dominate capitalistic economy opens up the potential economic relationships
- Financing through alternative markets such as credit unions is important because of the democratic structure; community bonds are an important strategy for financing because of the strong relationships that can be made with clients of the farm who want to support the project
- Fair trade has become an important part of the food movement and its concepts of bringing consumers and producer's closer together is the goal especially with the migrant workers that will be part of the farms workforce; other transaction practices such as gifting, bartering, and hunting are also part of the food system we want to create on Cavaleiro Farm
- Developing a cooperative like structure for the farmers that will be working on the farm

1.3 Overview

The rest of the project is broken up into three sections which constitute the areas in which I was able to apply popular education to the agroecological design process on Cavaleiro Farm. I've kept a basic format that is based on the popular education theme of Praxis. Praxis as I define it here is the process of learning which is cyclical and based on three steps; developing a theory, putting the theory into action and following up with a reflection to evaluate the theory based on the experience. Mimicking this format, I begin each part with a design theory and how it came to be. After the design I will focus on the implementation of the design along with appropriate comments. The reflection component comes in the format of recommendations for the agroecological design following a triple bottom line format of environmental, social and business.

Section 2: Cavalerio Farm Design Room

Challenge: Developing an agroecological design for a farm which is intended to service a diverse community is complicated because of the complexity of the farm ecosystem on an environment, social and business level. The Cavaleiro Farm design is informed by a diverse set of researched topics ranging from food specific research on sustainable farms to broader topics of organizing and triple bottom line business. How can we first common the knowledge behind the farm and second have it in a format that allows others to participate in transforming it into actionable outcomes?

Outcome: Converting the main room of the old farm house into a design room where information was grouped around themes using interactive graphics. Popular education informed the layout of the room, the activities and ways people could engage with the room.

Section 3: CavaleiroFarm.ca

Challenge: Access to information and coordinating group activities are always a challenge, especially when you add the layer that not all members and farmers live on the farm. In addition, from an operations perspective, managing and coordinating activities on the farm is a demanding job. The internet is an interesting way to create a virtual connection between stakeholders, while also potentially reducing the overhead of coordinating the workgroups activities.

Outcome: We launched CavaleiroFarm.ca based on a membership management platform which allows us to create a private website space. We also used Trello and Dropbox as supporting applications to the website. These internet technologies were explored in order to create dialogue and help with self organizing.

Section 4: Day on Cavaleiro Farm

Challenge: The type of group learning and adaptability for the organization that oversees Cavaleiro Farm is absolutely critical in the development of agroecological farming practices. There is significant work

needed in developing the processes of which the organization operates especially within the context of practically needing to grow food to make the project viable. Thus a daily structure for activities is needed which meets these objectives.

Outcome: A daily format which encourages agroecological patterns of thinking towards more sustainable farming practices. The format allows for different abilities, while encouraging different types of learning. The format is structured in such a way, three main parts, which is straightforward enough for people to be part of as new comers yet flexible enough to adapt to the social, environmental and business of farming.

Section 2: Cavalerio Farm Design Room

The Initial goal that began this popular education research section was the challenge of creating a collective process and vision that the Cavaleiro Farm organization could be built upon. Due to the geographic separation between individuals and also to ensure access to everyone, the strategy that emerged was to create a central design room at Cavaleiro Farm as well as online website that would mirror the same content. As concepts and ideas around this strategy developed in parallel, it became evident that there was a lot of information to collect, archive, access, etc. The theory was the use of the physical farm location which would be photographed and archived on a private network for members would provide a temporal solution to the main challenge being that different people would be at the farm at different times but need to share information. The intent was to have static content but also provide guides, activities, feedback and ways that individuals could make their own mark. Much of this inspiration came from signs found on hiking trails or boards found in workplaces with relevant information.

As the farm house was going to be around for at least a year as the plans for Cavaleiro Farm unfolded I decided to convert the main room into a design room that could be used for project management and dialogical process. Graphics became a central theme in the design room because they seemed to work well in communicating holistic concepts as well as being an accessible form of communication. David Sibbet's three book series on visual thinking and graphic facilitation were very helpful in understanding how to communicate the big picture of Cavaleiro Farm. My past experience as a mechanical engineer designer had introduced me to visual thinking in a small group dynamic and that energy of having a small group with focused vision is a strong inspiration for Cavalerio Farm. Sibbet's work as a whole was difficult to put into action because it lacked depth in the actual human to human facilitation and yet was filled with so much content. Popular education informed this aspect missing from Sibbets' work.

I found Lengler's and Eppler's use of a periodic table graphic to show the relationships between known graphics quite useful. (http://www.visual-literacy.org/periodic_table/periodic_table.html) Understanding the different types of graphics while also drawing on some previous research experiences at MES were helpful when it came to designing the graphics for the farm room which were all tied together using story telling.

The practical side of implementing the use of these graphics, the story telling, the ability to adapt to stakeholders needs, etc. comes from popular education and my experiences outside Cavaleiro Farm. In particular taking the Popular Education classes over the last two terms gave me opportunities to learn from myself and classmates as we navigated a range of popular education theory, practice and reflection. Student led workshops on a range of topics, experiences, research and activism not only informed what was on the walls on Cavaleiro Farm but other things related to the practical actionable side of using the room in the day to day.

Lenger and Eppler define visualizations as a 'systematic, rule-based, external, permanent, and graphic representation that depicts information in a way that is conductive to acquiring insights, developing an elaborate understanding, or communicating experiences' (Lenger & Eppler, 1) . The intent was then that the visualizations could be used to represent the complexity of Cavaleiro Farm while also not being overwhelming.

The layout of the room was organized in a clock wise fashion based on feedback from storytelling about Cavalerio Farm with various stakeholders. The iterative process of pitching a story that explained the project combined with seeing individuals attention span go from a barely a minute when I first began telling the story to fifteen plus minutes after some practice is what informed the layout. In terms of a conscious raising organization, the exchanges began to create a point where the other person would interject at some point with their own story related to food which often included fond memories and traditions. This iterative story telling process was definitely an important layer in presenting the design.

Vertically the room is broken up into three rows. The lower row stores graphics, supplies, templates and anything that is needed to use the walls. The top row is made up graphics area which is the main work area. All of the graphics on the top section can be removed and moved to a work table if the situation makes sense, the goal with the graphics is to represent the most information using the least amount of information. The middle row is the story which holds all this information together and its function is to guide people along the wall and situate each area. The content that makes up this row is the remainder of this section.

2.1 Conceptual Theory

The Cavaleiro Farm design room with its graphic walls are the transparent medium in which the landowners, farmers collective, farm members and other stakeholders can engage with Urban Crops as they develop an agroecological farm design for Cavaleiro Farm. Graphics are going to be used to communicate the most information using the least amount of information. Grounding the room in history of place and context which got us to today is as important as are the individual food histories of stakeholders. Agroecology, farmer cooperatives and food sovereignty are key trends that inform the design of the farm. Using a holistic farm framework to bring focus to Cavaleiro Farm we can collectively make decisions based on the environmental, social, and business paradigm. The goal is participatory and dialogical process related to sustainable farming operations on Cavaleiro Farm where an accessible format encourages adaptation over time. A common vision along with a diverse economy perspective is going to allow the Cavaleiro farm to move beyond sustainable farming through holistic accounting practices on the environmental, social and business levels.

2.2 Situating in Space

Located 30 minutes outside Toronto in the rural town of Schomberg, Cavaleiro Farm's landscape is marked by rolling hills, open pastures and woodlots with mature oaks and maple trees over 100 years old. The farm is located close to the main ridge which divides Lake Ontario with the Lake Simcoe water shed, thus giving the farm access to very clean water. Various springs provide supply to the two large ponds located at the farms center as the water makes its way north towards Lake Simcoe.

The farm began as 85 acres but due to the hydro corridor expansion in the 1970's and also the separation of two smaller properties the farm, it is now just over 65 acres. Most of the farm is covered

in pasture which last had cows grazing in 1990. Approximately 15 acres of the property is wood lots while another 5 acres is water.

As a result of only being organically managed over the farms history we find a rich sandy loom soil throughout the farm along with areas that have more clay and sand. The topographic conditions, along with varying water and soil conditions create a range of diverse growing conditions throughout the farm.

Solar exposure is excellent throughout the property because of its elevation relative to surrounding areas. Higher parts of the farm get full solar exposure year round which not only creates excellent opportunities for food growing but also alternative off the grid power potential.

2.3 Situating in Time

Historically the land on which Cavaleiro Farm is located was managed by Six Nations or Iroquois League. These original people lost their land through colonization and treatise to the first European settlers. The area of Schomberg was officially named Brownsville in 1830 before becoming a local hub for trade and changing its name to Schomberg in 1860. (http://www.schomberg.ca/)

The Courtney family lived on the farm since the 1920's where the Courtney family was known for building barns. Since this time a great deal of changes have taken place in agriculture and the makeup of rural communities. The large families and larger communities that were needed to work these farms seldom exist. What alternate social structures can we use to bring this scale of farms (100acre or less) into more productive use? Whereas my mechanical engineering background sparked an interest in agriculture, it was working with the farmers, the soil, plants and animals that grew that interest. This interest has reconnected me with my food growing lineage. In November 2013 my family, Gomes, purchased the Courtney Farm and renamed it Cavaleiro Farm after part of our family lineage.

2.4 November 2013 and beyond

Our family is historically from the mountain farmlands of Northern Portugal and living in small villages, which dotted the country side. For generations as a village you collectively grew what you ate, specialized in cash crops which lent themselves well to the microclimate. The diet mainly comprised of grains, vegetables, fruits, meats and dairy produced at a local community level. Cash crops included olives, chestnuts, wine and livestock. I was the first generation born off the farm. Living in Toronto we had a vegetable garden in the backyard growing up but otherwise I lost that intimate connection with growing food in a community.

My reconnection with food, which began just a few years ago, re-engaged my family with farms and how we look at the community around our family. As an individual with aspirations of farming, access to land was a huge barrier which alone I had no immediate chance of fulfilling without moving far away from Toronto, or other urban centers. I recognize my privilege in getting the chance to develop Cavaleiro Farm given its great soil and close access to Canada's most urbanized area. With my goal of becoming an agroecological farmer however, the 65 acre is much larger than I could ever farm alone. Thus the theme of developing a social structure of farmers that could adequately farm this scale of land is paramount.

What are the goals for the land with the family? The intent is to keep the land ownership in the name of the family as they will like to continue with their agricultural lineage. The vision is a low input cost operational farm which maintains a certain level of privacy while still offering opportunities for groups to retreat, learn on the farm. A vibrant local farmer incubator will be the main business operations which maintain positive cash flows to build up the farm. Currently Urban Crops has leased the property as they develop the project but the ultimate goal is to have a farmers cooperative type

organization manage the day to day farming operations. Cavaleiro will become a small village to the community which involved on Cavaleiro Farm.

2.5 Key Concepts

Situating Cavaleiro Farm within various global movements related to democratic control of food and a vibrant rural lifestyle is based on a number of strategic reasons. Simply put, there is no need to reinvent the wheel as there is a long history of food activism, sustainable farming practices, resilient organizing and positive impact business. Situating Cavaleiro Farm within these concepts is an opportunity to invite others internationally and also contribute to a global movement. The following concepts have guided my research over the last 2 years in MES and provide the key context needed to understand the purpose and goals of Cavaleiro Farm.

Researching food with a system-thinking lens brings about lots of information which can be overwhelming and challenging to communicate with others. The following words/concepts are intended to inoculate the activities that take place on Cavaleiro Farm and offer a direction for a shared common vision. This space on the design room wall is intended to engage with these concepts further. Popular education recognizes the complexity of meaning that be found in a single word in which our individual histories carry different attachments to words. The concept of hegemony also informs the analysis of power relations behind the meanings of words.

Food Sovereignty

Food Sovereignty, broadly defined as the 'right of nations and peoples to control their own food systems, including their own markets, production modes, food cultures and environments, has emerged as a critical alternative to the dominant neoliberal models of agriculture and trade' (Wittman, pg 4). The commonly used food security language, which describes 'a situation that exists when all people, at all

times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life' (FAO 2001), ignores the defining power relations that determine production, distribution and consumption patterns within the food system.

Discussing the power relationships behind food is very important, the holistic view around food which is promoted by food sovereignty takes into account many aspects of food but overall it puts the power of those decisions in the hands of many, horizontal, and not just a few who run food corporations. This horizontal organizing becomes quite a dynamic, self organizing force which has responded to the vertical integration (multinational companies which control all aspects of commercial food growing) of food on a global level. After all, since food is so interwoven into culture, having production, distribution and consumption patterns decided by a few companies which are promoting one system for all is cultural genocide.

Ths alternative model of agriculture was developed by peasants, small scale farmers, farm workers and Indigenous communities around the world, which organized collectively as the transnational agrarian movement, La Via Campesina. The National Farmers Union of Canada was among the founding members in the early 1990s as the farm crisis expanded. Canadian farmers have been caught in a 'cost-price squeeze in which profit margins shrink as input costs rise, while farm prices drop steeply' (Desmarais, pg 65). This cost price squeeze has influenced the rural depopulation, which has left Canada with very few farmers, from 1996 to 2001 Statistics Canada sights a 26.4 percent drop in Canada as a whole with Ontario dropping 31.5 percent in the same period (Statistics Canada, 2014). These conditions are certainly systemic and thus should also be part of our attention as we continue to build sustainable food systems.

Overall, food sovereignty brings into play many dynamics around food. A broader definition of food sovereignty, put forward by La Via Campesina demonstrates those dynamics (Desmarais, pg 34):

- Placing priority on the production of healthy, good quality and culturally appropriate food primarily for the domestic market. It is fundamental to maintain a food production capacity based on the system of diversified farmer-based production – one that respects biodiversity, production capacity of the land, cultural values, preservation of natural resources – to guarantee the independence and the food sovereignty of populations
- Providing remunerative prices for farmers (men and women) which requires the power to protect internal markets against imports at low prices
- Regulating production on the internal market in order to avoid the creation of surpluses
- Stopping the process of industrialization of production methods and developing family farm based sustainable production
- Abolishing all direct and indirect export aids

This strong cultural linkage in food sovereignty allows for individual histories of food and diversity, as opposed to the monoculture of the industrial global food system. This in turn, brings about complexity that exists around food, connecting Cavaleiro Farm to a broader movement and sense of purpose. This awareness of complexity is important on the farm because it highlights that Cavaleiro Farm is not just about food production. We are trying to farm sustainably and become part of a local food system in which we can interact with food and people. All these dynamics around food sovereignty bring awareness to the activities that take place on the farm and in our community. These dynamics are ever present and if not accounted for they still exist. Thus, it is better to be conscious of them then pretend they don't exist if we want to successfully challenge the neoliberal food paradigm.

Food sovereignty has influenced thus far influenced the design of Cavaleiro Farm in that it at least brings to our awareness the complexity of food and the relationship with the farmers.

How food sovereignty impacts the Cavaleiro Farm design

Food sovereignty encourages a broader definition of food which also corresponds to a broader definition of what farms are and the services they provide. These broader services are important to reflect in the design and the process of design.

Environment

- Food sovereignty encourages the use of agroecological farming practices which encourage sustainable land management practices.
- Local food systems are a big part of food sovereignty and local food systems would by necessity need to realign with local environment; thus food would become more seasonal, regionally appropriate for growing leading to better care of the planet

Social

- Brings democratic participation to stakeholders such as farmers, Community Supported Agriculture, CSA, members
- Clients of the farm get more than just food to consume; there is also going to be other opportunities to consume, such as workshops, conversations, trips to the farm

Business

- Holistic approaches, such as triple bottom line business and cooperative structures; at this start-up phase of Cavaleiro Farm we don't have a specific business entity in place, however we can operate and move towards the goal of setting up this type of business in the future
- People have complex relationships with food as informed by the complexity food sovereignty tries to offer us; offering more than just food consumption brings added value to clients; with regards to bringing farmer clients to Cavaleiro Farm, our goal is to create an environment where farmers can produce sovereign food and be part of larger global farmer movements

Agroecology

Agroecology, bio-dynamics or permaculture are much more similar than they are different and if we surely moved towards these types of food systems we would be beyond sustainable. I've chosen to focus on agroecology throughout this work because La Via Campensina promotes the use of agroecological farming practices as part of food sovereignty. Agroecology has also been promoted by the UN in response to climate change, increasing health issues such as under nutrientment and obesity. Agroecology also has roots in academia as much as it does in sustainable farming communities. Agroecology is also much more accessible for a graduate student at York University. Interestingly in terms of inclusiveness, today's conventional agriculture is a subset of agroecology and perhaps offers conventional agriculture a place to evaluate assumptions in the current system. For those reasons I'm using agroecology to describe the farming practices on Cavaleiro Farm.

Agroecology as a design approach views each potential site as different, thus developing a unique design given the site specific environmental, social and business considerations. Often the starting place for thinking around agroecological design is the question of "What would nature do?" which therefore grounds food production in an environmental framework and not an economic one. When you begin to look at the multiple species found in agroecological food systems and the resulting interactions you are then able to find limitless combinations and thus potential.

Agroecology uses the LER, or land equivalency ratio, in order to quantify these combinations and compare the production output of a system to the conventional monoculture equivalent. Agroecological systems yield more than just food, expanding food systems to include fuel, fodder, and medicine while encouraging diversity in ecosystems.

What agroecology can bring to the design of Cavaleiro Farm is a holistic way of looking at farming grounded in natural process and not market speculation. This reduces the systemic risk of

farming as much as possible, a farmers own insurance policy through diversity. It's also practical because it can provide almost everything a community needs.

How agroecology impacts the Cavaleiro Farm design

Designing an agroecological farm in North America stands in contrast with a conventional farm design. Agroecology provides us a model for lower input, resilient farming operations which are more integrated into local communities.

Environment

- Working with nature instead of in opposition
- Use of a wider range of species in polycultures thus providing not only more for humans year round but also other species
- Minimizes farm inputs, thus lower environmental foot print
- Farming with natural process and cycles creates a stewardship consciousness in farming

Social

- Accountability to the community around Cavaleiro Farm is part of the holistic framework for making decisions
- Cavaleiro Farm is focused on local food production, not just cash crops and export markets
- The farm is more than just food production; it's a space to reconnect to nature, play, learn, and create culture together
- Not just about selling food, but developing a food programming where people grow their own food

Business
- Diversified crops means diversified risk management while creating more even cash flows throughout the year
- Lower input costs reduces the need for borrowing while hedging against market speculation
- Diversify farm operations to include annual and perennial crops, livestock and medicines
- Clients can get much more value added from our food because of that connection to the farm and the environment

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Farmers' Cooperative

Good Earth Farm in Weare, New Hampshire operates based on an interesting organizational structure within the local food movement. As David Trumble puts it 'multifarm CSA is a connection between a group of growers and local customers. It is the union of two basic concepts: cooperation among growers, and commitment between growers and local customers' (Local Harvest CSA, pg 2). Both parts have contributed positively to farmers organizing a resilient living outside the conventional agriculture oligarchy. Cooperatives are based on a member owned democratically controlled organizational structure that in the long term has higher success compared to the conventional for profit business models. The commitment between growers and local customers comes through the form of a Community-Supported Agriculture, CSA, a model which is "an arrangement whereby customers pay growers in advanced of the growing season for a guaranteed share of the season's harvest" (Local Harvest CSA, pg 1).

A CSA has its roots in biodynamic farming as well as associative economics which seems to be synonymous with a diverse economy. This next exert comes from **Local Harvest CSA**:

"Biodynamic agriculture is a system of farming that extends the principles of organic farming to create a farm that is managed as a living organism. In order to manage a farm this way growers must mimic natural principles of sustainability as observed by Goethe and Steiner. Community-supported agriculture builds upon this idea of the farm as a whole organism by integrating the customer of the farm goods: by educating and involving the farm customer in the work of the farm, the customer helps to regenerate the farm in a way that is more meaningful than simple providing monetary support.

Associative economics, an approach that 'fosters interaction among producers, traders, creditors and consumers where appropriate price, true human needs, the eradication of

poverty, greater social equity, and environmental impacts are explicitly addressed" (Local Harvest CSA, pg 10)

Cooperative farming need not actually be a formal cooperative structure. In the case of Cavaleiro Farm the current model is that Urban Crops will function as the seed organization to manage Cavaleiro Farm and holds the direct lease to the Gomes family on Cavaleiro Farm. The goal is to set up not only the physical infrastructure on the property but also transition the lease from Urban Crops to a farmer cooperative. Cooperatives overall are a powerful way to organize for a number of reasons. For the purpose of this we will focus on a macro and a micro reasoning.

From a macro perspective, all cooperatives adhere to the following cooperative principles which analyzing from a systems-thinking perspective, influence how those organizations operate and interact with other entities. The short version is that taking on a cooperative structure brings you into the cooperative ecosystem of banks, labour, services and in Ontario a range of local food cooperatives operate across the province which provide support, products, services and ideas. It's easier to participate in the cooperative economy if you mirror the structure of Cavaleiro Farm.

Cooperatives around the world generally operate according to the same core principles and values, adopted by the **International Co-operative Alliance** in 1995. Cooperatives trace the roots of these principles to the first modern cooperative founded in Rochdale, England in 1844.

- **1. Voluntary and Open Membership**
  Cooperatives are voluntary organizations, open to all people able to use its services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.

- **2. Democratic Member Control**
  Cooperatives are democratic organizations controlled by their members—those who buy the goods or use the services of the cooperative—who actively participate in setting policies and making decisions.

- **3. Members' Economic Participation**

   Members contribute equally to, and democratically control, the capital of the cooperative. This benefits members in proportion to the business they conduct with the cooperative rather than on the capital invested.

- **4. Autonomy and Independence**

   Cooperatives are autonomous, self-help organizations controlled by their members. If the co-op enters into agreements with other organizations or raises capital from external sources, it is done so based on terms that ensure democratic control by the members and maintains the cooperative's autonomy.

- **5. Education, Training and Information**

   Cooperatives provide education and training for members, elected representatives, managers and employees so they can contribute effectively to the development of their cooperative. Members also inform the general public about the nature and benefits of cooperatives.

- **6. Cooperation among Cooperatives**

   Cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional and international structures.

- **7. Concern for Community**

   While focusing on member needs, cooperatives work for the sustainable development of communities through policies and programs accepted by the members.

   http://usa2012.coop/about-co-ops/7-cooperative-principles

Looking critically at these seven principles, it seems that point number five dealing with education, training and information forms an integral part of a learning organization. A learning organization is one that continually adapts to change, innovates and creates diverse opportunities. While these seven principles appear holistic together there seems to be a missing point on dealing with conflict and process. While a coop can have hierarchical structures, the structure tends to be more horizontal and thus decision making is done with more people. These communication and cooperation skills are not ones that have been developed and encouraged by our society, thus explicit development

of these skills is what makes these seven principles viable. This excerpt from Starhawk's **The Empowerment Manual: A Guide for Collaborative Groups.**

When we embrace conflict instead of fearing and dodging it, when we apply what we know about power and communication, mediation and transformation, when we approach our disagreements in the spirit of learning and compassion, then our conflicts can actually strengthen our group. When we wrestle with competing ideas and values and retain our love and respect for one another, we grow stronger and deepen trust. When we assure due process and, fairness and confront wrongdoing in the spirit of reconciliation and restoration, we can learn and grow from even the worst blows to community. As we become more skillful at resolving our internal disputes, we can strengthen our effectiveness in confronting the wrongs of the larger society and modeling more just and compassionate ways of beings. (Starhawk, pg 196)

How farmers cooperatives have influenced Cavaleiro Farm

The scale of Cavaleiro Farm at 65 acres matched with the sustainable farming practices that we want to use to manage the farm result in a need to have a group of farmers work on the farm. Farmers' cooperatives are structures which leverage the potential of the whole.

Environment

- Accountable structure where collective of farmers holistically manage the farm and improve its conditions
- Range of farming methods, crops and approaches to farming increases the diversity on the farm building soil and increasing water retention

Social

- Collective learning in a peer to peer environment. Everyone grows as a individual farmer while also the collective grows as an organization
- Reduces systemic risk to the individual farmers through communing portions of farm

Business

- Greater diversity of offerings to customers of the farm, potential for higher profit margin
- Begin to operate with economies of scale for purchases as well as reducing individual overhead
- Bringing value to clients through closing the gap between consumption and production
- Low cost organic production through minimal input purchases
- Cooperative structures have higher success rates than other organizational structures for businesses

2.6 Paradigms and Food

Why do supermarkets sell the varieties of vegetables and fruits that they do? Why are Macintosh and Granny Smith such popular apples? It isn't because they taste the best, or grow the biggest, or have the highest nutritional content or because we like the look of them or eat them. This decision, like all supermarket decisions are actually made by the agri-food industry. The top two priorities for the industry when it comes to picking what we eat at the supermarket is long shelf life and items that are good for transportation. By presenting a few options at their supermarkets it seems that consumers have a choice. But surely out of the thousands of known varieties of apples, there has to be some you prefer to Macintosh and Granny Smith. Our supermarkets will never deliver us to these new discoveries because they fit outside the current agri- food complex and the conventional agricultural model.

Antonio Gramci's concept of hegemony can inform the connection between paradigms and food. Hegemony refers to power relations and how controlling minority groups can influence how the majority of people live. In the case of food, a small group of companies not only decides what we eat, but also tells the stories of farmers that feed us and the circumstances which bring us together to share in food. This current paradigm only sees the portions of society and the environment which can be capitalized in a commodity based food system as important. It creates separation between what we eat and how it is grown thus leading to an industry which can have high unaccounted for externalities for society and the environment.

Agroecology reframes this paradigm of a food system by starting with what nature would do. We begin thinking about food systems with an understanding of the natural cycles and forces which ultimately lead to the food we eat. This paradigm has us thinking in patterns of environment first

expands to social patterns followed by more holistic business patterns. It seems to be the opposite of the conventional food system paradigm which encourages monoculture thinking.

Where conventional agriculture puffs its chest with advanced technology, sophisticated mechanization and uniformity of food product it does so to hide the fact that it has been exploiting communities and nature to bring us our food. Even when we look at a GMO plant growing on dead soil because of the interventions in chemicals for food and protection it is the natural character of the plant which synthesis its environment to make food and also it is the precarious migrant worker which harvests the food. The hegemony of agri-food has hidden this truth and taken the credit. Agroecology begins to pull back our food system from this minority grip and opens food to the commons of the environment. This framing is important for Cavaleiro Farm because we want to not only farm sustainably according to agroecological practices, but also develop social and business patterns which fit within this environmentally grounded paradigm.

2.7 Holistic Farm Decision Making Model

The Holistic Farm Decision Making Model was stumbled upon while researching holistic farming practices as a framework for decision making and fit so well within the design room that it created its own space with the design room. Agroecological farming, farming with nature, is a departure from conventional farming because a lot of the control is given to the natural cycles and the complexity of interactions thus our farming practices need to have adaption built into the day to day process. When we add the layer of multiple farmers in a collective to the mix of Cavaleiro Farm the challenge of organizing the farming increases further. The holistic farm decision making model gives the farmers a collective framework to make those day to day decisions. This model was adapted from Very Edible Gardens, VEG, Australia

http://www.veryediblegardens.com/iveg/holistic-management/400-holistic-management-veg-part1

Cavaleiro Farm is the whole under management in this case. The shareholders portion of the whole is expanded and referenced in the shareholder graphic and represents the community around the farm. The resource base is primarily the land that Cavaleiro Farm is situated on with efforts of sustainability leading to not importing inputs off the farm, however there are key resources in the community which can support the activities on the farm and need to be accounted for. The remaining portion of the whole under management is the diverse economy, which was expanded from the original VEG model which limited the scope to money. Again the diverse economy recognizes the non-capitalocentric economy that always exists around farms.

The holistic context for this holistic farm decision making model resonates with many of the themes of food sovereignty, farmer's cooperatives and agroecology. We can evaluate the context on both individual levels and also as a whole community. Some space is given here to explore these context questions more, otherwise we find holistic context throughout the design room.

Last step, we make tangible farming decisions using this model. The beauty in this model is the iteration. We constantly need to evaluate our decisions, learn and adapt the model to our needs. This encourages creativity, diversity and importantly resilience. This feedback process, with iterative decisions under ever changing context parallels the PRAXIS methodology which is part of popular education in that the purpose of this model is to move towards action. This model is for a productive, working sustainable farm.

2.8 Environment, Social and Business; Opening up Diverse Economy

The main body of the agroecological farm design is broken up into the three categories of environment, social and business. This format is part of the agroecological framing that we are trying to use on the farm as well as a business structure called triple bottom line business. The outcome we are trying to achieve is thinking, problem solving, designing and accounting with reference to the three categories. The categories do form a whole in terms of the design of the farm. The use of patterns throughout is an important strategy for learning and the transfer of knowledge. The goal is that through learning to recognize patterns in nature, will lead to imaginative, practical ways of organizing and growing lots of food that instil those same qualities of nature, diversity, resilience and creativity.

Environment Category

This is the reference category, the base of the pyramid of which there is the most information to learn from. This category is made up of 1) a map of Cavaleiro Farm, 2) map layers, 3) food producing patterns and 4) observations. The map is an overhead satellite image which gives a great bird's eye view featuring texture and color. Maps are a tool to talk about the environment. When we add map layers we receive another level of complexity. The map layers are transparent plastic sheets that can be placed over the map and allow people to use markers on the map as part of agroecological design and discussions.

A map layer can be about any subject on the farm, such as solar exposure, soil type, crops or how space is used by farm members or other creatures. Map layers can also be added together. For example you could use the solar exposure layer with a hydration layer to inform where you plant early spring crops that need maximum light and good drainage. Each map layer can be archived individually for reference.

Food producing patterns are any portion of a food system that can be patterned so that others can replicate or learn from the pattern. It is important that the patterns form building blocks which can be configured and combined depending on the specific growing situation. For Cavaleiro Farm most of the patterns have come from various books, journals and articles on farming, agroecology and permaculture. A few of the patterns also came from discussions with visitors to the farm and it is expected this will increase over time. Included in these patterns is anything from accomplishing a farm task to making a great omelette as all parts of local food culture are important.

During the walks on Cavaleiro Farm, or the times spent working in its fields or forests, the changing environment presented us with unique opportunities to learn something new which could help us build relevant knowledge. One can read about how much precipitation large trees accumulate from fog, but nothing is like the experience of stepping under the large oak canopy on the farm and suddenly feeling the rain being made by the canopy. Whereas the other areas of the environmental category might be a more patterned and standardized format for compatibility, observations and how we record these observations is open interpretation including story, diagram, song, theater, etc., as well as a standardized format for future referencing.

These elements put together describe the agroecological design of the farm. From Urban Crops perspective, the agroecological design for the farm is about setting up the proper infrastructure so that member farmers can begin developing their own plot. Urban Crops has developed the farm road system, water management, power distribution, paddocks and a percentage of land use estimation. This framework creates not only the infrastructure for member farmers but is also the most economical way to store water and build soils which are the foundations of ecological farming. These design tools are used to communicate these farming practices to stakeholders and range from informal to formal. During the duration of this project, these tools were used to apply to a water management grant, develop

project scopes with supporting businesses and engage farmers in conversations about the design of the farm.

Social Category

Social category is the area of which dialogue and active participation by members is perhaps the most important in comparison to the environment and business categories. In a big way, social design is what holds together the agroecological farming practices with regards to the environment and the business model. This part of the design room is comprised of the 1) stakeholder graphic, 2) member services graphic, 3) sitemap for cavaleirofarm.ca, 4) workgroups and 5) organization patterns.

Stakeholder graphic has the potential to capture a range of information for the stakeholder groups connected with Cavaleiro farm. The first layer of the stakeholder graphic is just the label of the group, such as landowner, enterprise farmer, etc. But the graphic is also quite versatile in that it can be adapted to show other layers of information, lending itself well to democratic voting process. For example, we can distinguish between internal stakeholders and external stakeholders by drawing a circle around the internal stakeholders. Further information could be embedded within the graphic by creating a distance scale from the center of the circle outward. If a group was present, one could use a dot vote method to set the distance of the stakeholder groups thus having a general snapshot of the groups view socially towards Cavaleiro Farm.

The member's graphic was meant to be an area where Cavaleiro Farm member services and equity are broken down by each membership type. Cavaleiro Farm will operate in a similar fashion to a private golf club on one end of the membership spectrum providing a premium food experience while on the other end of the spectrum we have the enterprise farmers who will have a range of services and equity in Cavaleiro Farm providing them with the best environment to develop themselves. There are a membership types: enterprise farmer, migrant farmer, general farming membership as well as

supporting memberships called oak and aspen. Each membership is designed to support the activities of the other membership types. This graphic represents what each membership gets in return for the yearly fee where the return can be food, service, knowledge, or equity.

Membership management for Cavaleiro Farm will be done using an online application designed specifically for managing memberships. The website is also meant to reflect the design room and the overall organization of Cavaleiro farm, thus a sitemap as a graphic is useful in that it shows how the cavaleirofarm.ca is organized. A sitemap gives us a systems perspective and was primarily used to discuss the interactions of the various aspects of the design. Because the whole website is built on multiple online infrastructures, the website is a kin to a multi-celled organism where the objective of the organism is to facilitate a diverse economic practice on the farm. Thus, part of the sitemap indicates which components facilitate components of the diverse economy.

A social component that we can greatly learn from our environment is organic organizing which is coordinated through the workgroup graphic. Achieving organic organizing process will be one of the major positive indicators that we have succeeded in implementing the farm social design. The graphic is intended to promote an action oriented organizing.

All the graphics and the way in which these graphics were used are part of the strategy to encourage dialogue by stakeholders around the organization of the farm. The use of social patterns is analogous to the production patterns that agroecology uses, in that we can develop social patterns specific to the farm as we learn and evolve. Research on farm, cooperative and organic organizing resulted in a number of patterns that influenced the social framework thus far.

Business Category

Business is an interesting category in our society because an organization can fail greatly at the environment and social aspects of its operations yet continue to operate if it maintains business and profits. This severely skewed paradigm has the potential to unravel our civilization as it has happened many times in the past. Alongside the business hegemony however, we do find many positive business stories with many potential lessons which can inform agroecological farm systems. This section is made up of 1) business strategy canvas, 2) financial pies, 3) business patterns and 4) a timeline.

The business strategy canvas is a powerful graphic for business development because it contains all the critical components of a sound business plan. The design of the graphic itself reflects the relationships between the different elements and every business can be represented with this simple model. A modification to the original business strategy canvas is to modify the revenue and cost portions of the graphic to reflect the triple bottom line model. This graphic is a great tool for dialogic business discussions because it does represent all the important business elements.

Financial pies encourage holistic accounting and thinking patterns. The pies represent a whole and can have unknowns or normally externalized costs. In this way they work well with the diverse economy model in that they can represent non capitalocentric aspects of the farm also. The financial pies can change can adapt and change depending on the conversation. Their simplicity will be part of the reporting structure and are intended to support community financing endeavours in the future.

Business patterns are the analogs of patterns found in the social and environment sections. There are many great business practices, lessons and strategies from other business organizations that can inform Cavaleiro Farm. The road of farming has many financial challenges and the more we can learn from other organizations lessons the better. Overall we can look to improve three business metrics through our agroecological farming practices; reduce costs, increase revenue or increase profit margin.

The timeline graphic is a classic business tool that allows organizing towards the future while also giving us a reference of our history. The timeline helps organize farming activities, construction projects, workshops and other programming on the farm. Notes on the timeline can link to other graphics in the design room such as a particular map layer for a project. The timeline is also helpful in managing resources on the farm and planning year round food production.

Section 3: CavaleiroFarm.ca

On the Cavaleiro Farm we are trying to create a village environment that can foster a diverse economic model. Cavaleiro Farm thus far has been informed by developments in intentional communities, eco villages, agricultural tourism and online communities. This part of the project focused specifically on the use of internet technologies for horizontal organizing, management and promotion of Cavaleiro Farm. Web technologies support a lot of the activities on the farm and are intended to run in parallel with other projects on the farm such as the design room which will use the online for archiving. The major challenge with organizing around Cavaleiro Farm is the physical separation between stakeholders in the project. Therefore online technologies provide an opportunity to shorten that distance and create a greater sense of community.

The strategy for this part of the project was to use existing internet based infrastructure which could be reconfigured to our needs, customize the solution and use some prototypes to learn about integrating online for Cavaleiro Farm. The popular education research goals for this section were to create a strong connection between elements of Cavaleiro Farm using websites, archiving abilities, support the organizing of farm operations, a diverse economy model and a system which is accessible to individuals who do not use internet technologies. In previous research projects in MES I had explored the intersection of technology and food justice, finding an interesting intersection of democratic control, distributed self organizing components and transparency. This part of the project allowed me to put into

practice these elements which were previously researched and explore further how they can be informed by popular education.

The first part of the process was extensive research into existing online technologies which could be adapted to our organizational structure as well as Cavaleiro Farms food production. There exists a plethora of internet technologies for other sectors which have faced similar operational challenges. Finding a suitable option consisted of not only evaluating what other existing farming and cooperative food organizations have been using but also to looking at examples from other sectors. With goals in mind, as well as some potential operational examples, I began taking trial licenses with software packages and used personas and different emails, to test each package as if a group of individuals were using them. My background in computer software had introduced me to team management software, knowledge management software and client resource management packages. Dozens of software packages exist in each category and my experience as well as a system-thinking perspective was helpful in the evaluation phase. Major considerations were cost per user, flexibility to adapting software package, archiving ability, which platforms the software performed on and ease of use, especially with mediums such as images, video, etc.

The evaluation phase resulted in a short list of potential solutions which were further tested with two volunteers given specific tasks that reflected expected common activities. The result of this part of the research was to use three software packages as part of an integrated approach, Wild Apricot, Trello and Dropbox. Wild Apricot is a membership management software package that is great at managing stakeholders, events, newsletters and allows users to create membership only access to parts of the website. Trello is an application which works equally well on a desktop or a smart phone. Trello is a great project management tool that can easily be configured to any organizational process. Finally

Dropbox is an application which allows users to access files from any computer. Together these software packages provided the basis for the cavaleirofarm.ca website.

With the selection of the software components, I could then focus on the actual integration of the technologies with farm operations. This aspect is the creative, design portion in which many of the popular education concepts could be integrated into the research. A good starting place is the Cavaleiro Farm design room which was discussed in the previous part of the project. The site map, overall architecture of cavaleirofarm.ca, was developed keeping the design room in mind, for example portions of the design room influenced the about us page and the layout of the website directly mirrors that of the environmental, social and business design.

Images of the design room are collected bi-weekly from Cavaleiro Farm and then uploaded to the website. The chronological capacity of a blog type page allows a user to access previous iterations of all the design room walls while the use of images references the information in the design room in detail. In this way the richness of information in graphics is translated into the site with minimal loss. Because of the dynamism of farming operations, the two week updating is enough for more static content such as visions, timeline, various maps, and graphics. However, when it comes to every day operations we use Trello which is much more dynamic and practical to use for day to day operations.

Dropbox is used to store a bulk of the content after it goes into archive plus it gives members a space to share research, images, video and other types of content. Dropbox was chosen because it is fairly straightforward to use and provides a similar experience even on different computers or platforms. With all the systems a certain component of training is required so that people use the technologies in intended ways. The training is an opportunity to get comfortable and build confidence in using the technologies and arises from experiences of assuming everyone could learn to use systems equally quick. The current structure for the online technologies along with the use of the design room

also function for members who do not use the internet because we can supplement online with print outs and phone calls.

How cavaleirofarm.ca influenced the Cavaleiro Farm design

The impacts of leveraging online technologies have significant implications for how the farm operates. Online technologies open up the potential for design because these technologies introduce lower cost options.

Environment

- Saves unnecessary trips to the farm because information is accessible, i.e. weather, or workgroups
- Connection to farm production such as controls for watering which will allow better use of resources
- Coordination of activities so that for example a trip to pick up material from supplier happens on a route where other pickup activities are done

Social

- Accessible online space where information from design room and other organizing activities is archived and accessible
- Connection with community outside the farm such as global movements, supporting communities
- Private space and public parts of website support the diverse economy we are trying to create around Cavaleiro Farm
- Multimedia integration allows for different forms of cultural production

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Business

- All aspects of food production is managed online and allows multiple people to be part of food production process, packaging and distribution
- Members of the CSA can coordinate weekly food deliveries as well as have access to added value features such as open farm times, workshops and workgroups
- Crowd funding campaign, donations and activities with partners can be supported through website
- Operational space for diverse economy actions such as up cycling, gifts, barter, etc

Section 4: Day to Day at Cavaleiro Farm

Having long term planning, common vision and overall processes that are geared towards action are obviously an important part of a working farm. These things help make the most out of days on the farm and ensure efforts are put towards long term strategies. For Cavaleiro Farm a lot of what we are trying to do with agroecological farming, although being done throughout the world, is still very much experimental especially given the unique context of time and place. Coupled with this is a certain transient component to Cavaleiro Farm in which we see members of the farm living offsite and coming onto the farm as well as the other stakeholders that interact with the farm. So how can popular education inform that one day on the farm? For the duration of this project there were a number of days in which various types of people came to visit the farm, both individually and in groups. This created the opportunity to practice facilitation skills that encouraged discussions around food, farming and specifically Cavaleiro Farm.

Popular education can inform many aspects of the experience of visitors to the farm. With our long term goals in mind of having a learning organization and creating the environment where people can feel fulfilled in exploring local food systems, the day to day practice is foundational because it reflects the values of the farm. For this project I had specific goals that I wanted to explore using popular education and they were as follows:

- Create the circumstances which led to conscious learning

- Accessible schedule which could adapt to specific visitors and what is happening on the farm

- How to get active participation – focus on Praxis where visitors do something on the farm

- Make meaning of what is going on at the farm through language people use to describe it

- Challenge one sided design which is imposed on people by encouraging conversations and feedback with the people that will be affected by the design

- Challenge the learner – teacher relationship specifically by referencing nature and what we could learn from nature

- Encourage dialogue

Lots of goals, however, over the course of this project dozens of visitors and stakeholders came to the farm and participated in a range of activities which created the opportunity to explore of all these goals. The rest of this section will focus on specifically on a series of mushroom workshops and the general case of a visitor to the farm. Visitors to the farm allowed me to iterate and develop learning around facilitating these experiences.

4.1 Mushroom Workshops

The mushroom workshops were facilitated by myself and a collogue Phil Collins who also has a farm in the Greater Toronto Area. We both collaborated on this workshop because mushrooms were

part of agroecological design for each respective farm. However the bigger reason is that we saw a huge potential for developing a distributed network of mushroom growers in the area. Specifically, coming off a winter with huge ice storms which created damage to trees, we saw an opportunity to convert damaged trees into logs for mushroom growing. In terms of access, mushroom log production is low cost, doesn't require a lot of equipment, space or experience and thus we thought it would provide a great starting collaboration. Popular education informed a great deal of the workshop series and over the course of the series we got to learn about facilitation, design looms, story of place, sharing of food, learning activities that engaged different types of learning and practical hands on experience of log mushroom cultivation.

The workshops took place on three different farms over the course of the project with two weeks in between each workshop to adapt what we learned. This learning can be broken up into two phases. First, how Phil and myself worked through the process of developing the workshops and secondly, the workshops themselves and what came out of them. To begin with I think the collaboration of Phil and I was quite interesting because of the theme of solidarity in that although we collaborated on the workshop, we maintained a certain separation which not only supported individuality but increased the learning opportunity for the both of us. Both Phil and I promoted the workshop through our own networks, in a format that reflected our individualities, thus I got to learn from Phil's experiences promoting the mushroom workshop while he got to learn about how I approached the workshop. This advantage became more apparent as we moved to the second and third workshop in that we doubled our learning opportunity.

We began by preparing a design loom with potential activities for the workshop. We had a range of potential learning activities which supported a few types of learning. Since we were going to run the workshop in different locations, we wanted some components to reflect the specific locations

integration of mushrooms within the design. This reinforced the ability to go out and interact with the environment and opened up the learning beyond just lecturing. We also wanted to tell the individual story of the location to give some unique context to each workshop which made each workshop diverse, not just a one size fits all approach. The loom worked well as a tool to develop each workshop. In the first two workshops we made the agenda available at the beginning, however as this excerpt from **Working By Design** mentions, we as facilitators were the ones who could change the agenda, not as empowering as we could have been (Working by Design, pg 33):

> "It's also important to spell out the workshop design on paper, and provide this as a handout to participants at the meeting, probably at or towards the end. This technique, of making sure workshop participants see process as something constructed, is another element that helps us take control of our own learning.

> Those of us committed to democratic education practice cannot afford not to spend the necessary time planning and designing our work.

> Why spend time planning:

> - To show respect for people

> - To ensure better use of time and resources

> - To avoid the temptation to talk at people

> - To begin to deal with our nightmares

> - To help ensure control of the process by participants

One of the most exciting things to come out of these workshops was the mushroom ecosystem game which had people represent different elements of an ecosystem in order to understand how mushrooms fit in. We had thought about the game as an alternate way to learn about the ecosystem by

people using their bodies but only got the chance to use the game on the second workshop. Going into the game we had ideas of where the game could go and how potentially we could introduce topics, but it took improvisation to make the game work well. Being observant during the process allowed Phil and I to add information as appropriate. For example, we began with a few people role-playing as plants and we asked the plants to focus on what they do best, which is photosynthesizing. As a result one participant got up on one leg displaying a plant's attempt to maximise photosynthesising. This lead into a point we were trying to illustrate. That is, in the ecosystem plants get help from mushrooms in extending their effective roots so that the plant can focus on the synthesizing and not building underground roots. The format which we were trying to encourage was observation from nature, learning about patterns and informing how we view the world.

The mushroom ecosystem game allowed participants at the workshop to learn through touching, seeing as well as listening. We also spent 3 hours in the afternoon actually doing log and stump mushroom production which extended this learning experience while also actually producing dozens of logs ready for mushroom cultivation. The mushroom production process on logs is rather straight forward and one of our initial encouragements for doing this workshop series was to build towards a group of mushroom log growers. This part of the workshop not only reinforced learning for participants, but gave them a taste of what they would be signed up for if they wanted to get more serious with mushroom production. We organized the production into three stages: drilling, plugging and waxing, of which we encouraged people to move around and learn from all the stations. This free flowing organizing worked well because it allowed people to work more within their comfort area. Some people liked to move around stations to keep active, others like to spend longer periods at one station, while still others were not interested in the drilling station for example. All together people stayed engaged for the 3 hour period, while also we produced dozens of logs for mushroom production which was win- win.

We closed all the workshops with a quick overview of what we had done that day using a zine style guide from a mushroom workers cooperative in Alabama because cooperative structures is something we wanted to promote. On the second workshop we decided to do this last with the invitation for people interested in starting a small business or cooperative to stay around. This was a reward for those interested and allowed the not so interested to leave a little early. The remaining group seemed to ask more specific questions during this period, while giving at least some time for reflection. Throughout the workshop we had brought up small business perspectives and organizing as a cooperative or network of growers. The last period allowed us to focus on this point more with a group which was more interested in that aspect. Post workshops we sent each group a link to a drop box folder with a copy of all the materials we referenced as well as a survey to gather feedback.

4.2 General Day at Cavaleiro Farm

People put in lots of effort to come visit the farm, especially those without transportation. Thus it is important to make the experience unique, engaging and rich in food culture so that people would come away with something and potentially want to come back. Over the project period the farm was operating with a very flexible schedule of varied days and time throughout the month in order to accommodate the varied schedule of different stakeholders. From neighbors, to conservation representatives, other farmers and friends, family involved with the project, we had many opportunities to welcome visitors and give them different farm experiences. Early on in the project, I had originally tried to mirror Praxis in the format by trying to make each day have a theoretical (or thinking part), action (doing) and a reflection (not doing but talking). As things progressed during the project these three parts transformed into observational grounding, activities and food sharing which overall encouraged agroecological thinking and broader food sovereignty discussions.

Observational grounding had a few objectives. First to acclimatise visitors to the farm allowing them some time to become present and secondly, to spend time getting them into the pattern of observing from nature in order to then move forward with the rest of the day. When visitors first arrive at the farm it takes some time to get in the sights, sounds and smells of the place. Especially for visitors from the city, the farm is quite a change from the pace and stimuli of the city. Sometimes I had driven up with the visitors and I also needed some time alone to ground myself and prepare for the day. Thus I encourage visitors to first spend fifteen minutes walking around and become present. This gave everyone time to prepare for what followed which was most of the time a walk to a specific part of the farm just to observe. I would often select an area of the farm based on what the potential activities for the days were going to take place or if the visitors had specific interests. The walks always provided a number of observations and encouraged group learning.

As I have learned there are numerous activities at all times which can be done on an active farm. Action around farming is a big part of what we want, while also one of the best ways to really connect with farming and begin meaningful discussion. The challenge with these activities is that they need to be completed in a few short hours and often visitors have different abilities and experiences. Thus what ended up happening was the development of a list of potential farm activities that are actively updated and maintained. Just like workshops, these activities need preparation time and just as much effort in designing how the activities take place as it does the actual activity. Thought was placed on creating a range of activities that matched to different abilities. From having physical activities like moving logs for mushroom cultivation, to transplanting in the garden and skills specific activities like designing farm equipment or thinking in abstract about managing sheep on the farm. These activities encouraged a range of dialogue and the shared experience provided an environment which encouraged group thinking and cooperation.

What followed these activities was always a period of reflection. Often around a camp fire or the sharing of some food, sitting together while looking over the farm is a powerful experience after a day of activities. Where the activity portion of the day was very much about the present, this reflection period was about visions and what could be, providing information which informed how Cavaleiro Farm could operate in the future. Cooking food and eating together was not only fun but gave us lots of potential things to talk about. Often when cooking something we would learn of the many different ways of preparing the food and culture associated with these foods. There were also opportunities to bring local not so conventional foods (such as wild crafted vegetables, mushrooms, roots, etc.) into the mix in order to explore the (re) making of food culture. Having known edible foods was comforting and kept bellies happy so that we could try out new foods. The sacred fire we gathered around also brought a comforting feeling which encouraged open conversations.

These three phases of a day reflected the praxis methodology of popular education and even on the shortest of visits could a condensed version of these three phases happen. The format was adaptable enough to the range of visitors to the farm in terms of time, ability, and interests and from a farming perspective, when visitors came, things still got done. The overall theme of agroecological farming/food resonated throughout the whole day, which encouraged the patterns of thinking from the environmental framework. Overall it takes a lot of effort before the visits to prepare but the reward was open discussions where people not only discussed aspects of Cavaleiro Farm but also shared some of their own food history. As the project continues the goal will be to build the community around the farm, we will see how this format engages new comers to the farm leading to further visits and involvement.

How day to day influenced the Cavaleiro Farm design

Part of the design process involves stakeholder engagement and beyond the farm design, the farm will continue to operate with a mandate of engagement and active participation by the community around the farm. The day to day operations have implications that extend beyond the boundaries of the farm.

Environment

- Ground visitors to the pace of the farm, leave behind the environment of cars and concrete
- Observing natural processes on the farm which generate dialogue
- Having on farm activities to close the gap between food consumption and production

Social

- Accessible to different abilities
- Grounding pattern of agroecology – what would nature do?
- Encourages different forms of learning in a group learn environment
- Adaptable format to the people present
- Collective food growing
- Cultural production around new local food

Business

- Farm production is central to the daily efforts
- Encourage learning and creativity which is a competitive advantage
- Organizational structure is less defined and open to outside resources contributions

Section 5: Conclusion

To reiterate, popular education seemed to me to be as much of a personal transformation of awareness as it was a set of tools and a methodology or process for working outwardly in the development of agroecological design. Throughout the project there existed creative tension with what popular education is and how to 'apply' it. This elusiveness in naming popular education I think adds to its strength because it recognizes the ever changing ebb and flow of life. The original research question asked how popular education informs agroecological design and throughout the project I made connections between the goals of agroecology and popular education.

This project in many ways was an accumulation of my research at MES over the past two years. Yet I only conducted a few months of research and development specific to this project. Thus this project provides a snapshot in time of how popular education informed agroecological design. The real work will continue for many months and years as the project grows and provides more opportunities to learn and evolve. Like carpentry, popular education provides us with many tools, but it takes years of practice to become proficient in the use of those tools as no two pieces of wood are the same.

The next steps for the Cavaleiro Project are to continue with the components reflected in this project and engage with more farmers in order to finish the design proposal for Cavaleiro Farm. Developing an autonomous farmer collective on Cavalerio Farm is still the long term goal for the project where popular education is the social web that connects the environmental and business pieces.

Using my original research framework of systems-thinking, this project gave me practical experience in using systems-thinking as a consultant. I think popular education can inform a great deal about how we go about design in a broader sense than just agroecology. Systems-thinking requires tremendous information and data from a diverse array of sources, experiences and contexts.

Information reveals the complexities in interactions which leads to understanding of patterns within the system. This project has allowed me experience in systems-thinking for both agroecology and collaborative groups.

Before I continue, I will take a moment to characterise this document based on an analog natural experience of walking through a forest along a path. Much like a forest, this document was the path we followed to arrive here at the end. However with every step we could have veered off to the side and explored another path. The subject matter we zipped through was just so we could arrive here and at least get a sense of a part of the forest where agroecology and popular education intersect. Here are some of the things I have learned about the application of systems thinking as a result of applying popular education to agroecological design.

Storytelling has a fantastic ability to communicate lots of information in a format that engages people and keeps them interested. It works under almost every circumstance and it is a medium in which others will join in and tell their stories. I learned about using storytelling to organize the design sequence of information, just like our walk through the forest. Active listening (seeing, tasting, etc), I've learned, is integral to storytelling in a few ways. Actively listening to the environmental and social information makes the storytelling a conscious two way communication that can inform learning while storytelling. Active listening is also important when others tell their stories and can encourage the sharing of storytelling time.

I often present very compact sentences filled with many bits of information where each word can continue on as separate discussion. With agroecology there are many directions to go because of the scope of diversity. I've learned that one of the best ways to build trust with others in conversations is be able to make connections with the topics under discussion. I often can reference a book or two on the subject and I can either contribute my personal experience or know of someone we could ask. This

has been a learned method of actionizing the curator-like personality of a systems-thinker and 'free' further information builds a trust based on collective learning.

Doing things together is a unique environment which allows certain kinds of interactions between people which are otherwise very difficult to have such as working in the garden or walking through the forest as a group. When people work together physically, I've noticed it tends to encourage more genuine conversations and interactions. From an agroecology perspective it is outside where the classroom is located and with some facilitation others can learn how to interact with this type of classroom.

Not being the professional is the other great challenge of systems-thinking. More horizontal forms of organizing have much more potential for adapting as time passes. With experts at the wheel the group never really forms capacity to self regulate and adapt. The expert becomes the limiting factor in many ways. Knowledge does not get distributed; it becomes stagnant in the sea of change while others become disenfranchised with the project. Big insights resulting from this project have been how knowledge is created and how we share it.

These personal learning experiences form part of the conclusion of this project and as informed by popular education what we learn from personal transformation is just as important as the potential for social transformation. Agroecology is part of a growing sustainable farming movement which are all promoting social transformation through our food system. The power of using food for transformation lies in its ubiquitous use in society and the relative ease in which people can transform seeds and soil into food. As written in **Take Back the Economy** about diverse economies, 'We didn't need to wait for the revolution; we could smash capitalism by working at home in our spare time' (Gibson-Graham, etc, pg xi)

Popular education brings the agroecological farm design to a larger backyard of Cavaleiro Farm, but none the less this project ventured forward exploring how stakeholders can be part of the design process. With stakeholders as a part of the design, the intent is that then stakeholders will continue to be actively involved in the Cavaleiro Farm community which provides a space to really support a community economy. It remains too early in the project to come to any conclusions on the level of engagement of stakeholders and also if Cavalerio Farm promotes the building of a community economy. The only thing we can measure is initial support of stakeholders towards the project and the resulting use of diverse economic practices.

Throughout the project, people were supportive through donations of equipment, time and service. Bartering has been a component to payments for services and products, while the food growing in the fields has been in incentive for people to come visit the farm and spend some time helping out in exchange for fresh produce. The backdrop which has allowed these activities to take place has been the combination of the Cavaleiro Farm Design Room, cavaleirofarm.ca and also the day to day format stakeholders experience and interact with. Overall this project has informed the amount of investment that is needed to create the supports for popular education to take place.

This investment has been primarily human capital and as this project has highlighted, small investments (materials, internet, etc) can be stretched to go a long way in developing more democratic forms of organizing. Thus continuing work or investment in developing peoples capacities to work in groups towards goals of community economies seems to be an area of importance because the potential to lower the initial 'costs' for other groups to organize. Overall I think the way we approach this is to develop more popular education facilitators who can support groups in the development of process. A facilitator can bring the popular education tool kit and through working with groups adapt

those tools to meet the needs of those groups. This new knowledge has the ability to adds to the tool

kit, effectively expanding the popular education knowledge.

Section 6: Bibliography

Books

Gibson-Graham, J. K., Jenny Cameron, and Stephen Healy. *Take Back the Economy: An Ethical Guide for Transforming Our Communities*. N.p.: U of Minnesota, 2013. Print.

Gray, David, Sunni Brown, and James Macanufo. *Gamestorming: A Playbook for Innovators, Rulebreakers, and Changemakers*. Sebastopol, CA: O'Reilly, 2010. Print.

Gilbert, Faith. *Cooperative Farming: Frameworks for Farming Together*. Essex: Greenhorns, 2011. Print.

Horne, James E., and Maura McDermott. *The next Green Revolution: Essential Steps to a Healthy, Sustainable Agriculture*. New York: Food Products, 2001. Print.

Kerridge, Eric. *The Farmers of Old England*. Totowa, NJ: Rowman and Littlefield, 1973. Print.

Mang, Pamela, and Bill Reed. *Designing from Place: A Regenerative Framework and Methodology.* Building Research & Information, 40:1, 23-28, 2012.

Marino, Dian. *Wild Garden: Art, Education & the Culture of Resistance*. Toronto: Between the Lines, 1997. Print.

Miller, Sally. *Edible Action: Food Activism and Alternative Economics*. Halifax, N.S.: Fernwood Pub., 2008. Print.

Mollison, B. C. *Permaculture: A Designer's Manual*. Tyalgum, Australia: Tagari Publications, 1988. Print.

Osterwalder, Alexander, and Yves Pigneur. *Business Model Generation*. Hoboken NJ: Wiley, 2010. Print.

Perry, Jill, and Scott Franzblau. *Local Harvest: A Multifarm CSA Handbook*. S.I.: S.n., 2008. Print.

Soule, Judith D., and Jon K. Piper. *Farming in Nature's Image: An Ecological Approach to Agriculture*. Washington, D.C.: Island, 1992. Print.;

Sibbet, David. *Visual Leaders: New Tools for Visioning, Management, & Organization Change*. Hoboken, NJ: John Wiley & Sons, 2013. Print.

Starhawk. *The Empowerment Manual: A Guide for Collaborative Groups*. Gabriola, B.C.: New Society, 2011. Print.

Yeomans, Ken B., and P. A. Yeomans. *Water for Every Farm: Yeomans Keyline Plan*. Southport, Qld.: Keyline Designs, 1993. Print.

Video

"17 Days In Community: A Manifestation of Love." *Top Documentary Films RSS*. Our Eco Village, 2014. Web. 15 Feb. 2014.

"All Things Are Connected." *Top Documentary Films RSS*. N.p., 2012. Web. 16 Feb 2014.

Back to Eden. Dir. Dana E. Richardson. Perf. PAul Gautschi. ProVisions Productions, 2011. DVD.

Cesar Chavez. Dir. Diego Luna. Perf. Michael Peña, America Ferrera, Rosario Dawson. Canana Films, 2014. DVD.

Edible City: Grow the Revolution. Dir. Andrew Hasse. 2012. Internet.

"No Logo: Brands, Globalization and Resistance." *Top Documentary Films RSS*. Naomi Klein, 1 July 2003. Web. 12 Nov. 2013.

Website

Lengler, Ralph, and Martin Eppler. "A Periodic Table of Visualization Methods." *A Periodic Table of Visualization Methods*. N.p., 2007. Web. 21 July 2014.

Section 7: Appendix

Appendix 1: Panorama of the design room

Figure 1: Design Room SE corner

Figure 2: Design Room SW corner

Figure 3: Design Room W wall

Figure 4: Design Room NE corner

Figure 5: Design Room NW corner

Appendix 2: Specific shots of the different graphics

Figure 6: Diversity Game. Ecological Grounding patterns of design and thinking

Figure 7: Farm map as base layer with plastic layer overlay showing farm road and land disturbance are for this year's water projects
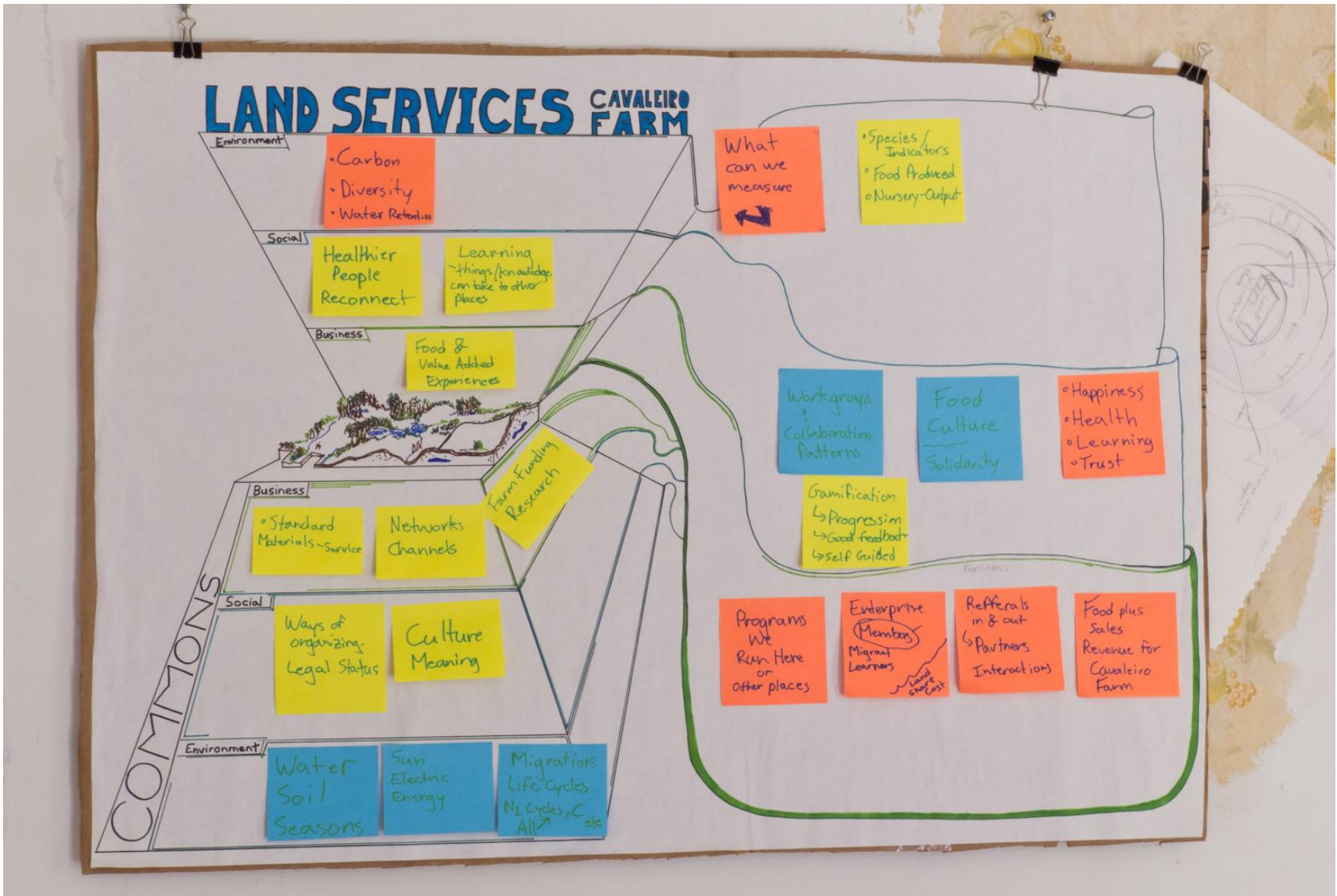
Figure 8: Land Services. Looking at the commons in which the farm is situated and the various yields that come from the farm
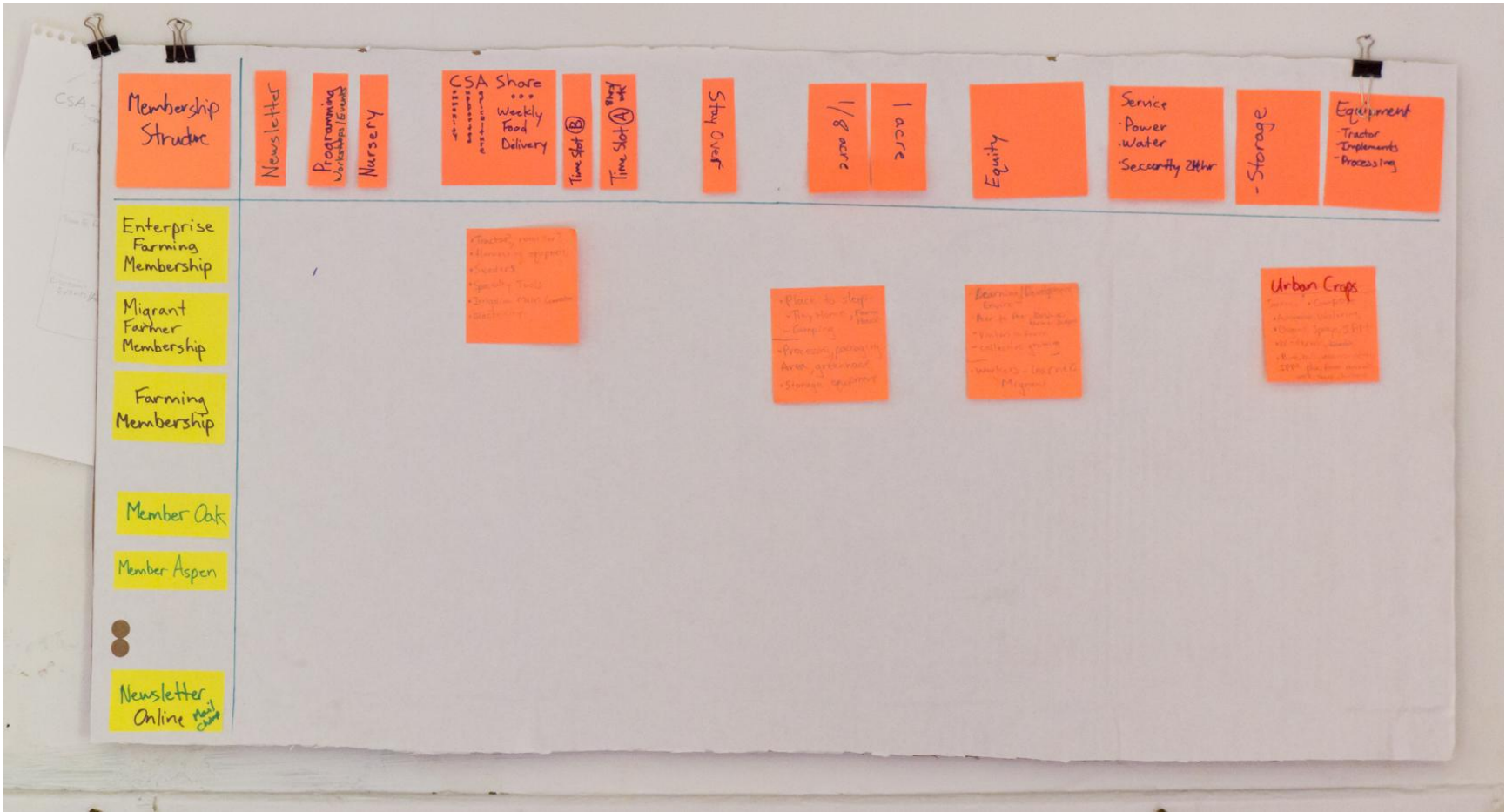
Figure 9: Membership Services. Mapping which types of members want which types of services
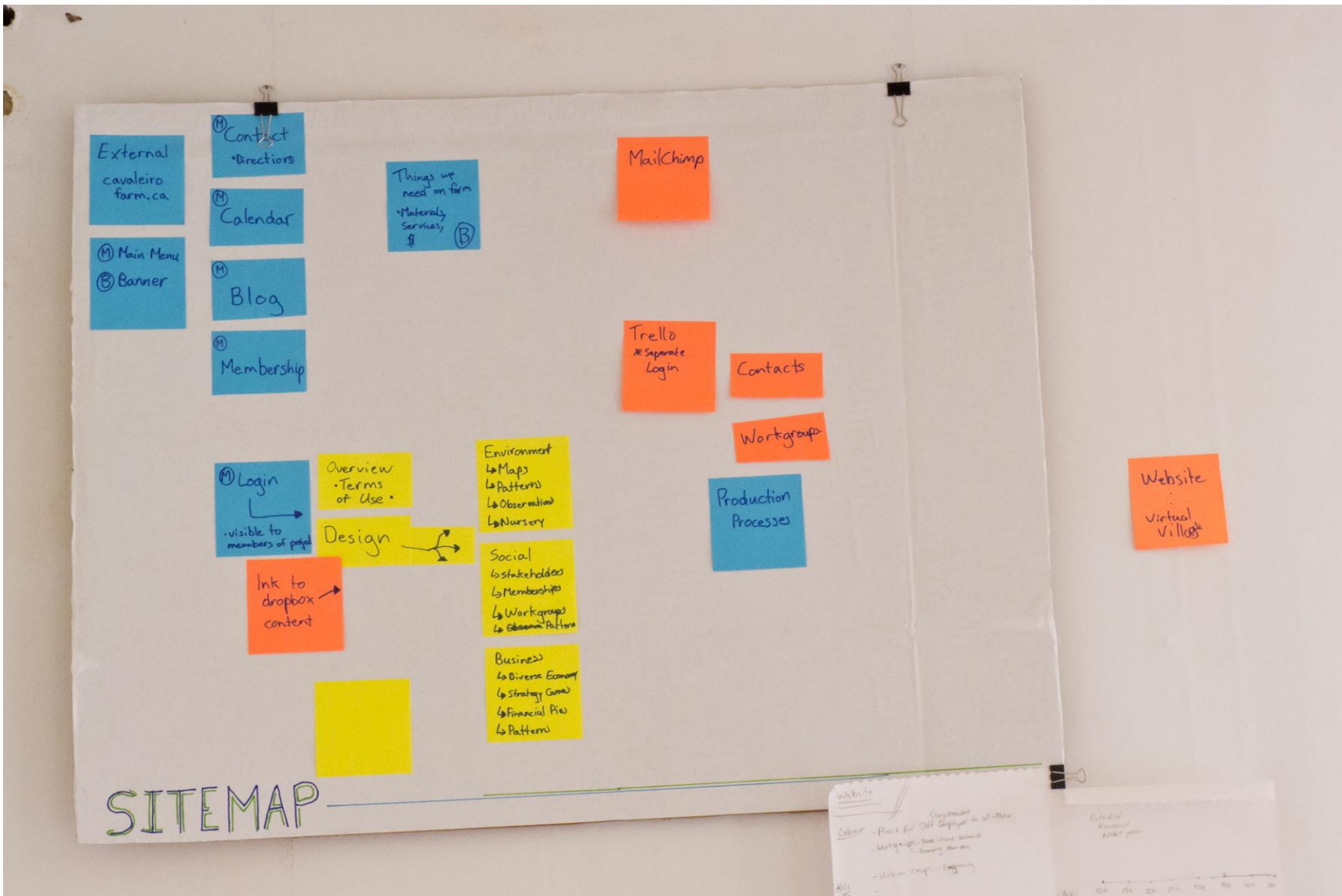
Figure 10: Sitemap outlines how the various online components fit together. Sitemap reflects how information about the farm is organized.

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Figure 11: Diverse Economy Model. This graphic has space to work out ways to apply the diverse economy theory to farm practice.

Figure 12: Business Strategy Canvas is a graphic which encapsulates all the important aspects of the business model for Cavaleiro Farm.
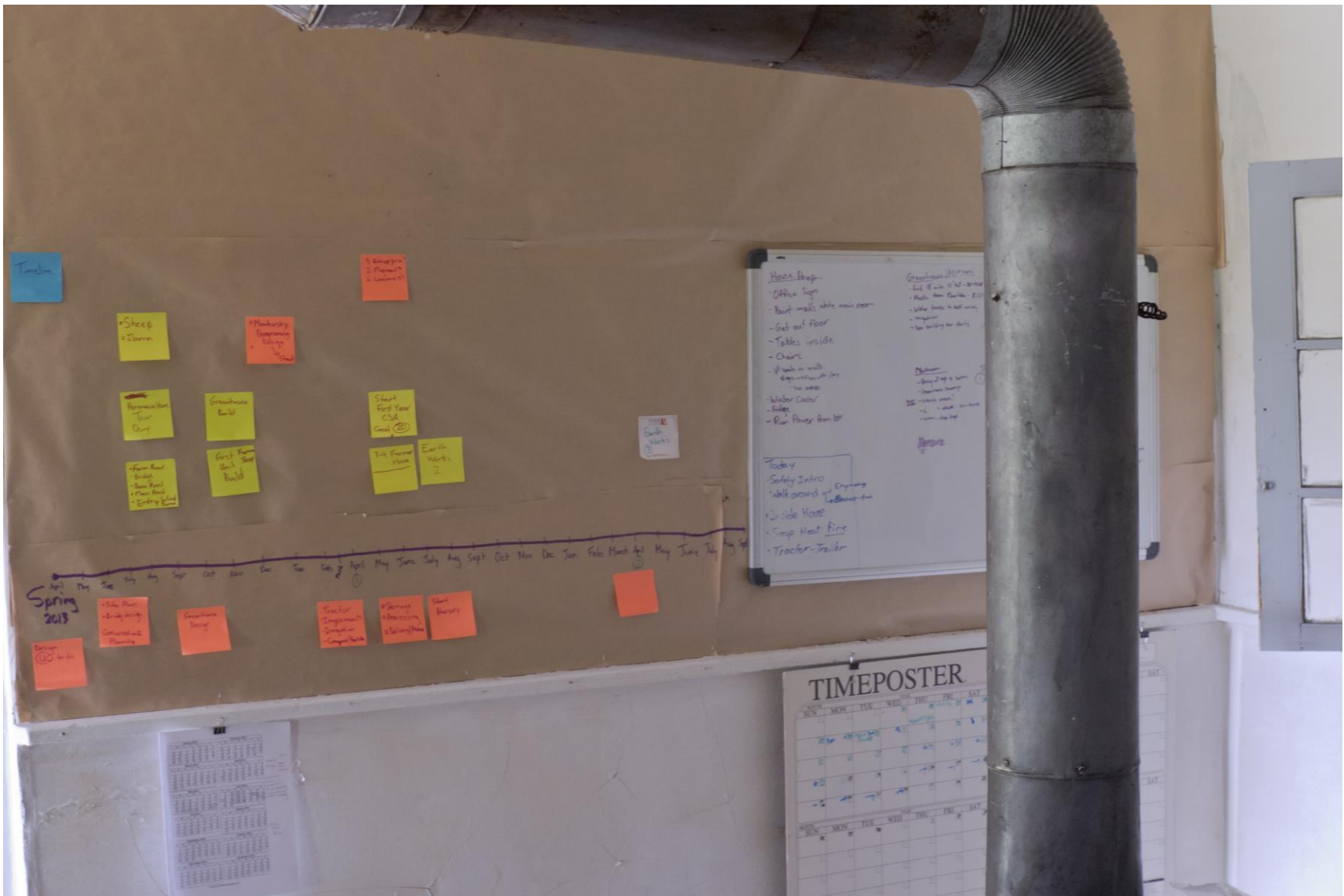
Figure 13: Timeline over next 2 seasons. Also To-Do white board and 4 month calendar

Appendix 3: Diverse Economy Handout from Popular Education 2

This handout was produced by Chris Cavanagh as a compliment to the concepts found in **Take Back The Economy: An Ethical Guide for Transforming Our Communities**

Economic Relationship	LABOUR (Work)	ENTERPRISE (Business)	TRANSACTIONS (Market)	??? (Consumption)	PROPERTY	FINANCE
Ethical question	How do we survive well?	How do we distribute surplus?	How do we encounter others as we seek to survive well?	What do we consume?	How do we care for our commons?	How do we invest for the future?
Ethical goal	*Surviving well and equitably*	*Distributing surplus to enrich social and environmental health*	*Encountering others in ways that support their well-being as well as ours*	*Consuming sustainably*	*Caring for – maintaining, replenishing, and growing – our natural and cultural commons*	*Investing our wealth in future generations so that they can live well*
Dominant / Hegemonic Economic Practice	WAGE	CAPITALIST	MARKET		PRIVATE	MAINSTREAM MARKETS
Alternative economic practice (still likely capitalocentric but they don't have to be)	**ALTERNATIVE PAID** • Self-employed • Reciprocal labour • In-kind • Work for Welfare	**ALTERNATIVE CAPITALIST** • State-owned • Socially Responsible • B-Corporation • Social Enterprise • Non-profit • Environmentally responsible	**ALTERNATIVE MARKET** • Fair Trade • Alternative Currencies • Underground Market • Barter	**ALTERNATIVE ??** •	**ALTERNATIVE PRIVATE** • State-managed Assets • Customary (clan) land • Community Land Trusts • Indigenous Knowledge (Intellectual Property)	**ALTERNATIVE MARKET** • Cooperative Banks • Credit Unions • Micro-finance • Community-based financial institutions • Community Bonds
Diverse economic practice (non-capitalocentric but vulnerable to being so)	**UNPAID** • Housework • Volunteer • Self-provisioning • Slave Labour	**NON-CAPITALIST** • Worker Cooperatives • Sole Proprietorships • Community Enterprise • Feudal • Slave	**NON-MARKET** • Household sharing • Gift-giving • Hunting, fishing, gathering • Theft, piracy, poaching	**???** •	**OPEN ACCESS** • Atmosphere • International Waters • Open Source IP • Outer Space	**NON-MARKET** • Sweat Equity • Family Lending • Donations • Interest-free loans

How do we survive well?
• What do we really need to live healthy lives both materially and psychically?

- How do we take other people and the planet into account when determining what's necessary for a healthy life?
- *Surviving well and equitably*

How do we distribute surplus?

- What do we do with what is left over after we've met our survival needs?
- How do we make decisions about this excess?
- *Distributing surplus to enrich social and environmental health*

How do we encounter others as we seek to survive well?

- What types of relationships do we have with the people and environments that enable us to survive well?
- How much do we know about those who live in distant places and provide the inputs that we use to meet our needs?
- *Encountering others in ways that support their well-being as well as ours*

What do we consume?

- What materials and energy do we use up in the process of surviving well?
- *Consuming sustainably*

How do we care for our commons?

- How do we maintain, restore, and replenish the gifts of nature and intellect that all humans rely on?
- *Caring for – maintaining, replenishing, and growing – our natural and cultural commons*

How do we invest for the future?

- How do we store and use our surplus and savings so that people and the planet are supported and sustained?
- *Investing our wealth in future generations so that they can live well*

Appendix 4: Screen Shots of CavaleiroFarm.ca

Figure 14: CavaleiroFarm.ca administration area which allows public and private pages to be created.

Figure 15: CavaleiroFarm.ca Administration page for Contacts. One of the reasons this software package was chosen was because it works well for managing contacts, and keeping stakeholders engaged with unique content to each group's needs.

Figure 16: CavaleiroFarm.ca Membership administration area. We can develop membership applications, different levels of memberships and automatically send reminders or updates.
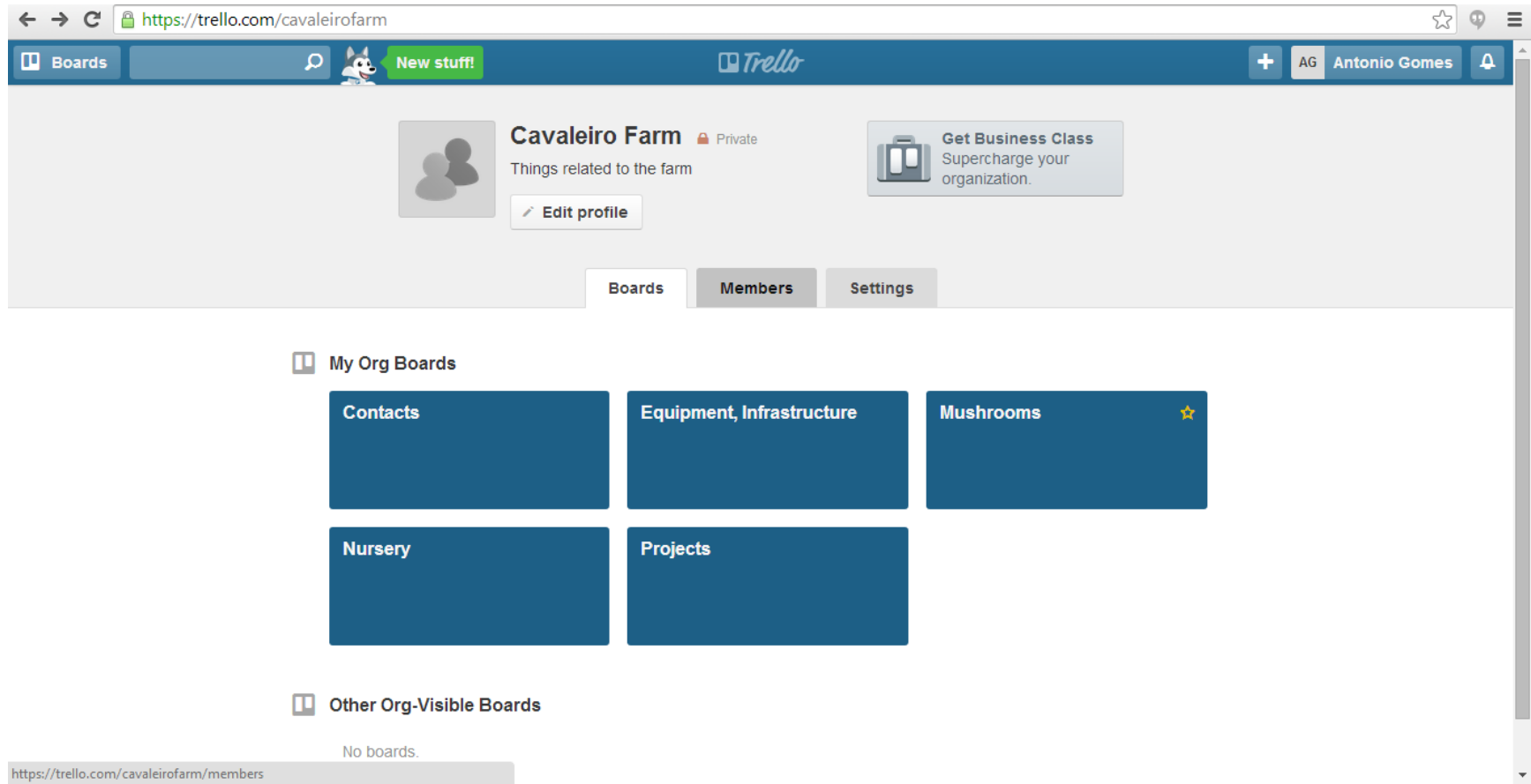
Appendix 5: Screen Shot of Trello

Figure 17: Trello main page for Cavaleiro Farm. This application runs on phones, tablets and phones. Free service that Cavaleiro Farms uses for managing day to day resources and projects. This is the main page for adding boards and members.
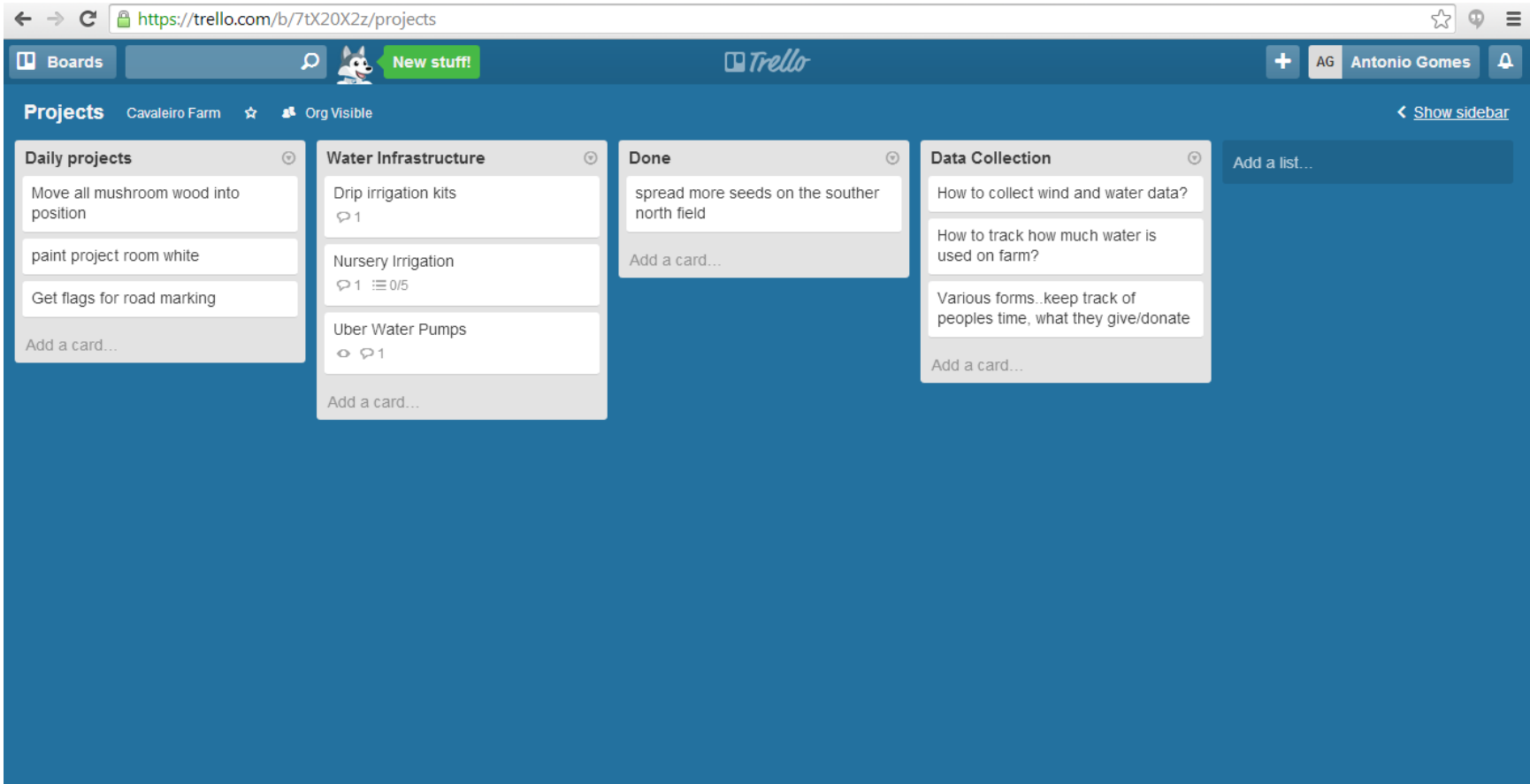
Figure 18: Projects page on Trello. We can define the board names and the flow of boards replicate processes and flows. Unlimited reconfiguring as process develops
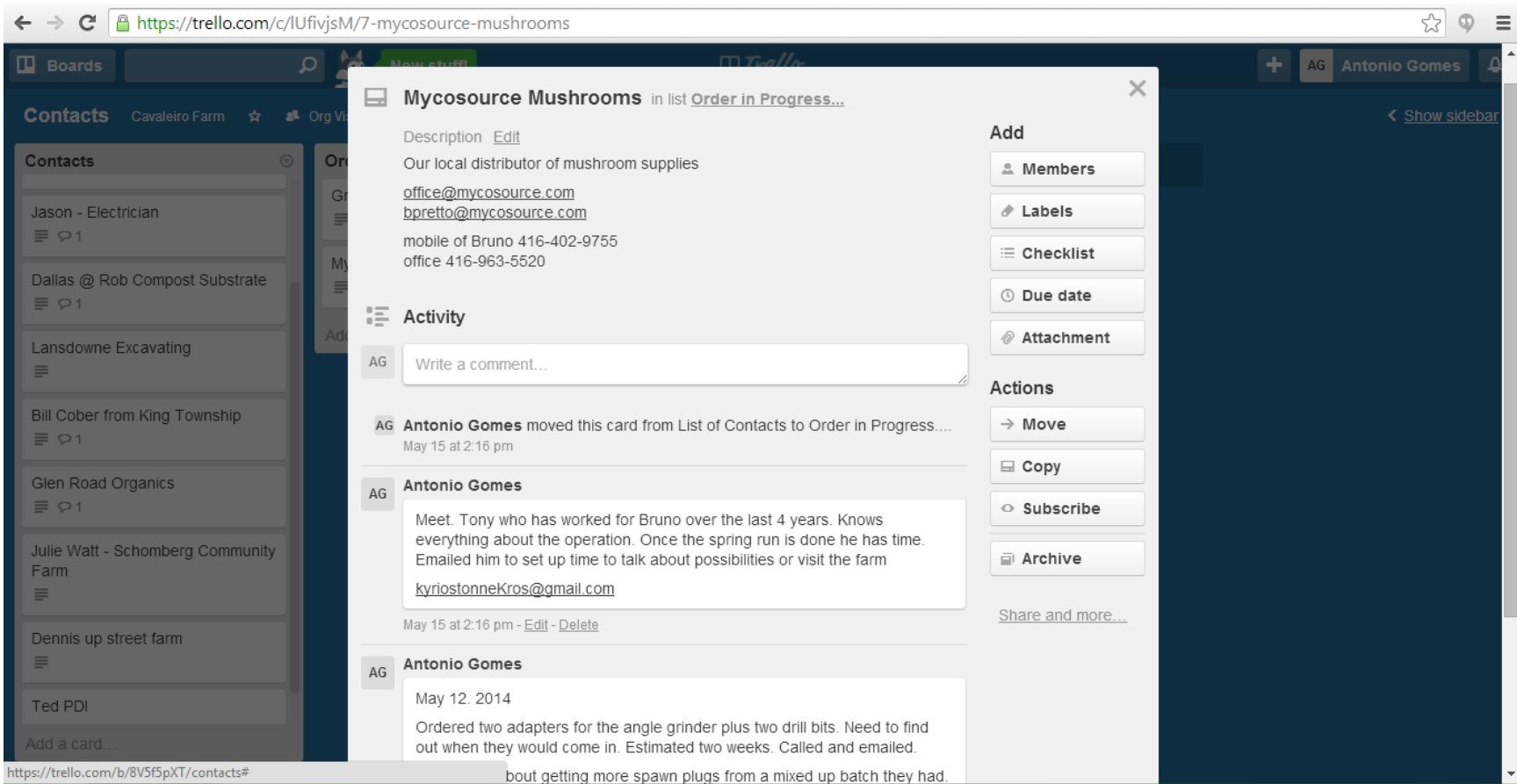
Figure 19: Detail of card on Trello. In this case we are using the cards to track service providers to the farm. The cards allow us to add any type of media, assign tasks, define due dates or customize organizational characteristics like labels and colors.

Appendix 6: Design Loom for Mushroom Workshop

Dream list of goals/outcomes:

• Hold collaborative workshops between the two farms • Interactive workshop around mushrooms that sparks conversations about the niche of mushrooms within sustainable food/farm systems • Use the extra hands to get both farms wood supply ready mushroom production • Test potential leads for future workshops • Have fun, share food and hangout on the farm	•

Brainstorm list of possible activities:

Principles activities		Warm-ups/Energizers		Evaluation
• Group share learning – groups share their experiences with activities in other stations. Within the context of the specific activity and next layer; why are they doing what they are doing • WHIMIS – Safety overview on any activity that may have more risk than normally present • Ecosystem game – people represent different elements..plants, water, nutrients..and we construct the synergistic ecosystem to find mushrooms place. After it is built we can also play the part of conventional agriculture and see what happens to mushrooms within the ecosystem.	• One thing you know about mushrooms and one thing you hope to learn after today •	• If you were a food… • Through the ball, call the name • Remote control cars • Intuition..what is this plant • Your name and what interests you about mushrooms.		• Follow up survey

TIME		OBJECTIVE	METHOD	DESCRIPTION OF PROCESS	STUFF	WHO
9am	15min	Situate attendees to workshop	**Discussion & Questions**	• Sitting in a circle with the farm as a back drop • Where are the bathrooms, where food will be served, first aid station • Go over Agenda for day • Any questions?	• Farm Map • Agenda	Host
9:15am-9:45am	30min	Why mushrooms? Within the site specific design	**Presentation & questions**	• Sitting in a circle with the farm as a back drop • What are mushrooms? Situated within the taxonomy? Needs and Offers? Niche description in growing, food or medicine • Overview of the farm design – Objectives/goals • Strategy of the mushroom. How mushroom production helps us meet our goals. The use of the map of the farm could be useful for showing where production takes place and some of the associated workflows	• Farm map • White board or big paper • markers	Phil
9:45am-10:15am	30mins	Mushrooms within the Soil Food Web	**Presentation & Questions**	• What is the Soil Food Web? Use diagram to explain the relationships • Why is it important? The story of how plants interact with the soil food web..aid? • Growing with fungi and not? Use two potted plants to show the difference • How to we support beneficial fungi? Inoculation, food for mushrooms • Magic fungi	• Diagrams • Grow mycelium in soil • Two potted plants • Rich soil	Antonio
10:15am	15mins	What are we doing here?	**Overview of stations, split the group**	• Overview of the workstations • Split the group into two teams • Go to respective work areas	• Farm Map	Host
10:30am	2.5hrs	Workstation Work	**Hands On**	• Overview of safety • Go over examples and goals for the session • Safety equipment and any specific safety precautions • Do work • If finish early use energizer activities of others to fill time	• Tools for work • Site prepared, tools and materials	Station supervisor

| 1pm | 1hr | Lunch and stories | **Food in mouth** | • A story about forests or mushroom folk to get people imagining
• Food, plates, drinks, spots to sit and chillax
• Ask the group to share stories about mushrooms or experiences earlier in the day
• Perhaps a social energizer exercise
• Splits and go to new work stations | • Food, plates, drinks
• Spots to sit, put food
• Hand wash | |
| 2pm | 2.5hrs | Workstation Work Part 2 | **Hands On** | • Overview of safety
• Go over examples and goals for the session
• Safety equipment and any specific safety precautions
• Do work
• If finish early use energizer activities of others to fill time | • Tools for work
• Site prepared, tools and materials | Station supervisor |

Appendix 7: Zine Draft with Workshop Notes

Mushroom Workshop Draft Reference Guide (Gives you the idea but never really useful enough to do it..ie not detailed and boring)

authors

Phil Collins and Antonio Gomes

This guide is intended to be used as part of a 7 hr hands-on mushroom work-shop on various sites throughout the Greater Toronto Area that are using log- mushroom growing as part of an ecological farming strategy. This reference guide is intended to follow along actual content in the workshop. It's in chronological order.

Proposed Event Dates 2014

May 18th

May 31st

June 15th

June 28th Cavaleiro Farm

Equipment Needs

Angle grinder adaptor to chuck (drill bit holder)   2 @ $50 plus plus tax, ship equals $130

Angle grinder

Saw horse log holder

Spawn Order (Wax)

Safety Gear

General Needs

- Catered Lunch – thoughts of salad, rice and Portobello Burgers
- Coffee Percolator
- Tea Pot

Pre Checklist

- Bug Spray
- Garden gloves
- Forest gear – boots and layers ?

Page 1

Objective: Title page for guide and event

Content:

Table of contents for guide.   Suggest three parts: Lunch. Forest. Spawn.

Notes: Phil you wanted Kate to work on the title page. I thought after that what would be cool was that each host can get to choose the front cover. The other side can be for whoever else; co-op, person, business, organization helps out.

Page 2

Objective: Show the Entire Mushroom Growing Process Life Cycle

Content:

Fungi reach beyond the soil food web and can be found on the outside of plants, inside of trees and even outer space. In the case of the soil food web it plays a critical role in part of a healthy resilient ecosystem. Fungi represent their own kingdom and have a unique place within the soil food web because they have attributes that we find in both plants and animals.
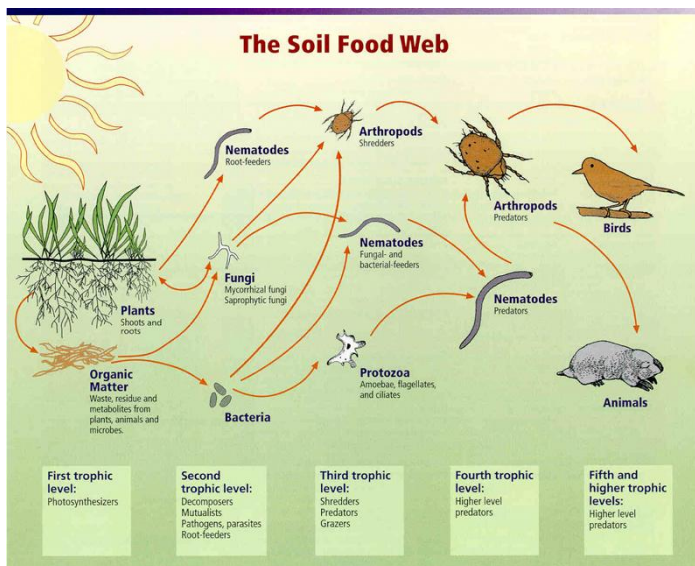
Relationships between soil food web, plants, organic matter, and birds and mammals
Image courtesy of USDA Natural Resources Conservation Service
http://soils.usda.gov/sqi/soil_quality/soil_biology/soil_food_web.html.

Why is learning about this so important to farming? Farming without the use of chemicals (ie organic, permaculture, no-till farming) is built on the foundation of a strong living soil. Fungi contribute greatly to the health of the soil and its ability to produce food, support life.

Story: How mushrooms fit into the ecosystemic design of this space. An overview of the decisions that arrived at the current integration of mushrooms into the design of the farm.

Page 3

Objective: Demonstrate the critical role of mushrooms in the ecosystem

Content:

Get image from Sepp Holzer showing more details of mushroom growing as part of fruit tree farming and straw production for soil building. Main image.

Get image to represent activity

Mushroom Habitat

- Moist
- Shade. Needs little light
- Warm temperatures. Ideal is in the low 20s. Bellow 10 degrees they stop growing.

Activity

Option – either reference actual plants growing or use people to represent plants

Discussion..how mushrooms fit within the other ecosystems. For example plants, which you can pull one out of the earth and physically look at it or use people from the workshop to represent the people. They contribute to the ecosystem the ability to take light and transform it into sugars, collect carbon, make oxygen. They focus on this, hence they don't move to quickly and have an equally important end called root systems. Plants have formed many interesting relationships with animals as well as mushrooms. For example plant's have smaller root structures than they would normally need because mushrooms do a lot of similar functions to what roots do.

Points to talk about. Mushroom Services.. moving water, making nutrients available, protecting plant from pests, increase water and air capacity of soil, holding soil.

Page 4

Objective: Show root cycle and bring up adding carbon to soil as best way to help feed mushroom

Content:

Image from orchard book showing perennial root cycle.

Discuss carbon to nitrogen in the soil. Ratios. Orchard ratio. Thus the need to add carbon to soils is best thing to help mushrooms.

Page 5

Objective: Top 5 list of do's and don'ts

Content:

Top don'ts

- Tilling, soil disturbance
- Chemical fertilizers
- Pesticides
- Not feeding the soil. Cleaning away debri, not growing perennial carbon sources

Top Do's

- No-till or low till practices
- Use inoculants such as good compost mixed with forest soil or compost tea's
- Grow mushrooms, bio remediation, spent material
- Feed your soil with carbon like mulch, wood chips, perennial plants, bio char, lenerdite
- Learn more about mushrooms, lifecycle, niche in ecosystem.

Page 6

Objective: Introduce Types of Mushrooms that can grow in Ontario

Content:

Chart with Type of Mushroom and Type of Wood that will go on.

Discussion. Why did we decide to use log mushroom production versus other methods like grain, or compost?

Page 7

Objective: Learn about the process we are encouraging today for mushroom growing

Content:

Find an image of the whole log mushroom production cycle

Page 8

Objective: Go over site selection and setting up the production area

Content:

Site Selection Criteria

- Accessible. Consider where the logs are coming from after they are inoculated and how often they have to be visited for harvesting.
- Shade requirements
- Water/humidity requirements

Images of logs in production patterns. Stacking, leaning, etc

Notes: Not sure if we should include this. Might be to much information and I think it might be details when people are just trying to grasp the basics.

Page 9

Objective: Go over Safety Protocol

Content:

We are on a working farm thus we need to wear appropriate farm clothing and also be individually aware of what is happening around us.

Wear clothing that protects you from the elements and especially while working with trees. Use gloves while moving logs.

One special work area is the farm inoculation station. The area is marked off with orange. Safety glasses and hearing protection must be worn in this area and there is a limit to two people at a time in this area. Station supervisor will give a lesson on how to work with the angle grinder for mushroom inoculation. In general

- No loose clothing, hair or anything else that could get caught in the rotating angle grinder
- Wear safety glass and gloves
- Be aware of the power cord
- Keep the area clear of debris and other tripping hazards

Page 10

Objective: Overview of Mushroom Nutrition

Content:

General benefits to mushroom eating. Content of mushrooms.

Notes: Good to talk about before lunch

Page 11

Objective: Ways to cook, store and otherwise interact gastorially with mushrooms ☺

Content:

Storing

- Paper breathable bag, vegetable storage in refrigerator for fresh mushrooms
- Dry, cool, dark place for dry mushrooms

Cooking

- Antonio likes stir-fry's and cutting up fresh mushrooms on salads. Wants to grow more resihi mushrooms to make tea.
- Phil likes pretending he is a dinosaur and they are smaller dinosaurs.....

Notes: Good to talk about before lunch.

Page 12

Objective: Follow up

Content:

We discussed ..

- Joining a workgroup..seeing interest in developing mushroom collective
- Trouble shooting tip..
- If you see logs give us a call!
- Other workshops
- Contact info

After the workshop

Send an engagement survey to follow up with attendees.