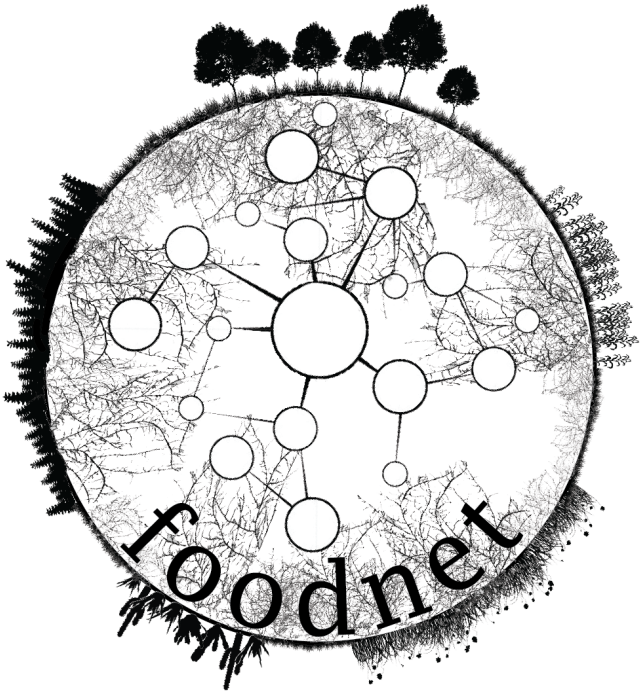

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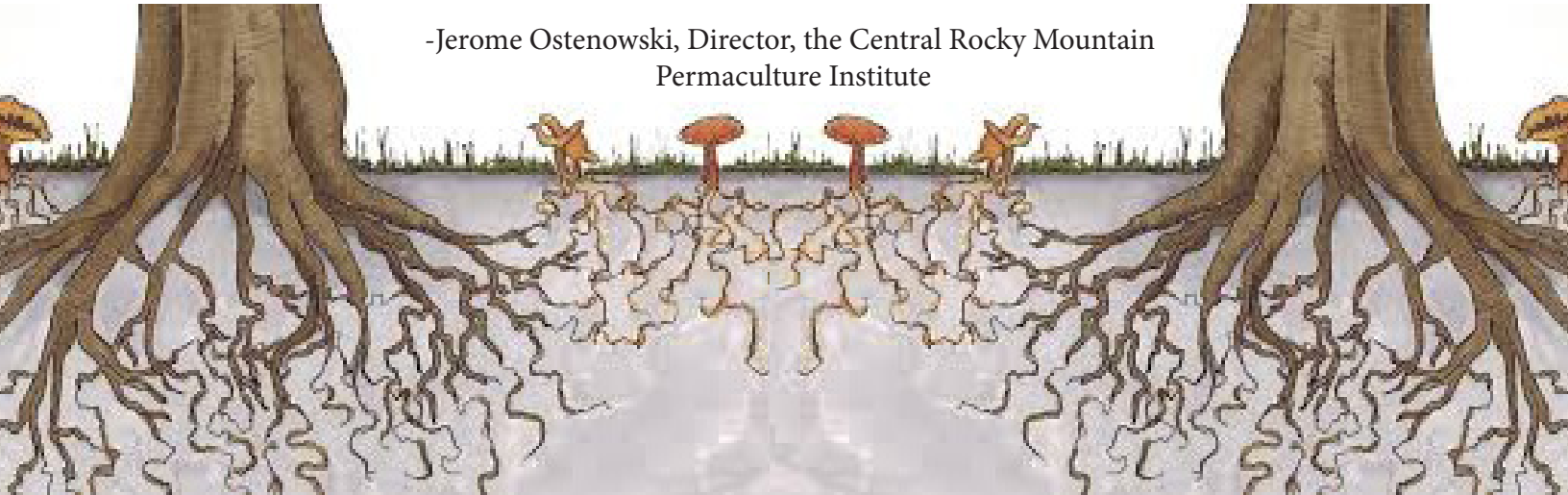
"If you drive into Maine, you see a big billboard that says 'The way it oughtta be.' That's my definition of permaculture."

-Jerome Ostenowski, Director, the Central Rocky Mountain Permaculture Institute



Introduction

The architect, the mail courier, the politician, and the student all begin their days with breakfast. It is difficult to identify any human enterprise that isn't connected in some way to the food system. Yet, even the primary components of the food system, from fertilizer production to waste management, operate in a socioeconomic environment which treats each stage as independent (this is why most people consider fertilizer production and waste management to be different activities). The layers of the food system have been peeled apart, and in recent history we have lived within the simplifying worldview that the components of the food system can be addressed separately without consequences. Everywhere we look, we can see the externalities of one component of food system negatively impacting the operations of another, and strained tolerance or outright hostility seem to be more common than mutualism and respect.

Compare this situation to the modus operandi for the vast majority of humanity's existence, when every aspect of community revolved around the most vital activities of growing, harvesting, and distributing food. The Greeks explained the winter as the kidnapping of Persephone, the Goddess of the Harvest; the Maya believed that the first humans were crafted from kernels of corn; and Tibetan burials consist of returning human bodies to the ecosystem by sky (vultures) or water (fish), the ultimate homage to the continuous flux of nutrients within the food system. Nearly every culture has kept meticulous track of the motion of the sun and stars throughout millennia, in large part for agricultural purposes. Celebrations of the summer and winter solstices formed an integral component of community structure for millennia. Surely modern people have a lot to learn from the values and practices of our ancestors, who were intuitively connected with life's unifying principles. This ethos, along with a rigorous examination of the food system and the natural models around us, will allow us to build a more collaborative and responsive food system from the bottom up

Scoping

To begin scoping this challenge, we sought a top-down understanding of the food system in order to identify its unifying patterns. We wanted to begin by developing a simple and naturalistic explanation of what the food system consists of. A decent model is that the food system is concerned with everything related to the stocks and flows of biomass. For many organisms, the food system is quite simple; consider a snake, who only needs to consume a mouse once a month when the weather is warm. Its ability to do so is dependent on the season, the population of mice, and its choice of a suitable hiding spot to wait for one to pass by. While each of these variables is subject to change due to other factors, the system can be understood reasonably well without much effort. The human food system, on the other hand, while fundamentally the same process as the snake's (eat enough to stay alive), is complicated by a plethora of factors: dietary preferences, overpopulation, urbanisation, irrigation, fertilisation, and so on. Creating a more sustainable human food system is much more difficult than creating a more sustainable snake food system, even though both systems have the same basic goal. Some of the most important unifying patterns of nature that are relevant to the food system include feedbacks, locality, adaptivity to seasonal variations, adaptation, and connections to other systems.

After discussing what we could from a top-down perspective of the food system and it's shortcoming (re: opportunities), we took a component-level approach to identify specific leverage points. We brainstormed as a team everything that we could think of that is related to the food system (SEE APPENDIX). Then, we

categorized these components into subsystems which can be viewed independently. These subsystems include food production, food storage, food distribution, food consumption, and waste management. There are abundant challenges facing each of these subsystems. In food production, we face the challenges of preventing soil erosion and nutrient runoff while providing enough food for all; in food distribution, we must learn to reduce packaging waste and food spoilage; and in food consumption, we must learn how to make conscious food choices. Fully scoping the challenges and opportunities in these subsystems is exceptionally difficult due to a variety of factors, such as the importance of place, connections to other systems and subsystems, and the wide variety of solutions already being explored. Difficulty in scoping food systems challenges is compounded by disconnections in the food system which manifest in many ways and at multiple scales.

There is a value disconnect which causes subsystems of the food system to work toward goals which undermine the food system as a whole. One of the most striking examples of this disconnect is the fact that consumers themselves lack psychological connection with the food that they consume, and are literally disinterested in understanding how a sausage gets made. A survey by the U.S. Farmer/Rancher Alliance discovered that "72 percent of consumers know nothing or very little about farming or ranching" and "Overwhelmingly, farmers and ranchers share the same values as consumers on issues related to environmental stewardship and animal care" [Whaley, Nationwide Surveys].

" . . . a system must consist of three kinds of things: elements, interconnections, and a function or purpose."

-Donella Meadows, Thinking in Systems

This disconnect eliminates feedback between consumers and other subsystems and creates a barrier to entry for innovative solutions to take a hold in the business community, where brute efficiency is more valuable than wholesome and integrative practices. Improving the public understanding of the food system would go a long way toward allowing a sustainable food system to flourish.

There is an information disconnect within the food system which leads to wasted energies scoping and addressing already solved problems and building infrastructure which already exists elsewhere. Discovering the values, goals, and methods of other groups and individuals can be greatly beneficial for directing one's own efforts. Without sufficient information transfer, counterproductive competition often ensues. Knowing when this occurs can be impossible due to the complexity of a food system in which new challenges are constantly being discovered and new solutions introduced.

There is also a stock disconnect which impacts the flow of physical resources in the food system. There is a lack of exchange of information and materials between parties which could be productive. One ramification of this is the enormous quantity of food waste that ends up in landfills despite the existence of hungry people and deficient soils. This problem is exemplified by how "In the USA, 30-40% of the food supply is wasted, equaling more than 20 pounds of food per person per month" [UNEP, World Food Day]. Food waste is biological matter and has value as composting for growing new food. With most of this waste ending up in landfills where it only produces methane, there is great opportunity in capitalizing on the value in waste.

Already, there is a great abundance of stakeholders working to correct these three disconnects in the food system: the value disconnect is often addressed by educators and philanthropes supporting community projects; the information disconnect is often addressed by stakeholders in the food system who recognize

the potential from networking and collaboration; the stock disconnect often provides opportunities for entrepreneurs and nonprofits to increase value present in the system. We would like to bolster the food system by networking the plethora of efforts to address these three shortfalls and make connections that wouldn't otherwise be made.

Building community in the food system leverages our pre-existing infrastructure to empower sustainable progress. We have identified mutualism as a primary biological function which allows communities to prosper over the long-term. The natural world exhibits mutualism at many scales of space and time. The lessons we can learn from the mutualistic relationship between insects and flowers grow more powerful through the grandest scale, the Gaian view that the Earth and all its life constitute a dynamic physiology. The ubiquity of mutualism (from cradle to cradle) lends force to the modern teaching that 'life creates conditions conducive to life,' as well as traditional prayers such as the Sioux 'Mitakuye Oyasin,' or 'all my relations' [Nahko].

Biological Inspiration

We learned a great deal from exploring a variety of mutualistic relationships in nature (SEE) and were able to extract inspiring themes. In nature, mutualistic relationships are often marked by close physical proximity, transformation and distribution of wastes, exchange of food, exchange of protection, exchange of childcare, exchange of housing, exchange of information, and communication through action (message sends itself, self organizing). These goals operate with feedbacks which introduce subtle or dramatic value structures into mutualistic relationships.

In studying mutualistic relationships, one group of organisms stood out as a true champion for fostering symbiosis and networking communities. Mycorrhizal fungi are a functional classification of fungi which associate with the roots of at least two plants, and are present in every terrestrial ecosystem. Simard et al (2012) produced an excellent review of what is known of the behaviors of these extraordinary fungi, and the following biological summary pulls primarily from their publication (exceptions are noted). These organisms are unique and mysterious, and unraveling their secrets has already yielded many important insights about plant life cycles, plant communication, ecosystem structure, and the structures of similar networks such as the Internet and the human brain, to name a few. Mycorrhizae and the systems they help define exemplify many of life's principles in elegant and humbling ways.

The functionary attribute of mycorrhizae which distinguishes them from other fungi is the network which they create with plant roots. These networks, referred to as mycelial networks (MNs), are critical to connecting terrestrial ecosystems with mutualism and feedbacks, and the strategies they employ to do so can be applied to connecting the human food system with mutualism and feedbacks. MNs allow individual constituents of a system to benefit from the diversity of the whole; diversity creates resiliency. The foundation of MNs rests on two components: the states of the plants, and the relationships between the plants. The details of how MNs process and respond to these two types of information is described below. The states of plants include such things as their genetic identity, their nutrient availability, their nutrient needs, their photosynthetic production, and the presence of pests and disease. The relationships between plants include physical proximity, root grafting, competition for resources, allelopathy, and the existence of MNs. All of these factors are subject to change acutely (such as a tree death) and cyclically (such as changing rates of photosynthesis based on the season).

MNs transfer nutrients and water between the plants which they connect. This often involves the transfer of fixed carbon down concentration gradients. In this way, carbon fixed by large, more established trees is funneled to smaller plants which are shaded by the canopy. Without this carbon transfer, seedling establishment in mature forests would be virtually nonexistent. This transfer is dependent on the carbon concentration gradient, such that smaller producers will be net sinks of carbon, and larger producers are net sources of carbon. Additionally, smaller producers which consume more carbon will also receive more from the MN. Some of this fixed carbon is used for the MN's own metabolic needs.

This nutrient transfer is an example of negative feedback at play in terrestrial ecosystems. In addition, the MN is able to access nutrients such as trace minerals, water, phosphorus, and nitrogen which plants may have difficulty extracting on their own. These resources are the primary material offered by the MN to large, well-established plants.

MNs also relay chemical messages between plants. The primary examples of this are the relay of defense messages and the relay of allelopathic chemicals. The former occurs in the case that a plant becomes stressed; messages will be sent through the MN which propagate to plants in the vicinity which produce stress responses. This has been documented for a variety of stressors including pest/disease, herbivory, and drought. The relay of allelopathic chemicals is a competitive strategy by the plants, in which the MN transfers chemicals produced by plants which are intended to inhibit the growth of other plants. The relay of both defensive and allelopathic messages indicates that the MN relays chemical messages indiscriminately, in such a way that the MN seems to serve as a passive information highway rather than a directed courier.

Applying Patterns to Design

We believe that we can create a more sustainable food system by introducing mutualism and feedbacks between different stakeholders of the system. MNs provide an excellent model for how these functions manifest in the natural world. MNs leverage the strengths of individual components of terrestrial environments (plants) to create ecosystems which are more robust than the sum of their parts. Thus, we propose the design for the FoodNet (FN) inspired by the design principles employed by MNs. Instead of connecting plants in an ecosystem as the MN does, the FN will connect stakeholders of the food system, from farmers to food banks to students.

As stated previously, the foundation of MNs rests on the states of plants and the relationships between plants. Similarly, the FN relies on the states of food systems stakeholders and the relationships between the stakeholders. The states of food systems stakeholders include their values (sustainability, social justice, money, community engagement, etc), their roles (producer, distributor, consumer, educator, activist, etc), their needs (physical

"We can't impose our will on a system. We can listen to what the system tells us, and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone."

-Donella Meadows, Thinking in Systems

Biological Stategy	Design Principle
Strongest connections with largest trees	Start with large producers
Strongest interactions between plants of the same genus	Facilitate interactions between similar players (2)
Most mycorrhizal interactions are passive, meaning that the mycelium does not 'decide' what flows through it	Self-organizing (3)
Mycorrhizae network through a series of dense clusters and filamentous tendrils, similar to the structure of the brain, the internet, or the distribution of mass in the universe	Growth in nodes and links; Growth similar on all scales (4)
Mycelium will associate with plant roots, or, in some cases, even enter the plant cells	Close proximity (5)
The transfers facilitated by mycorrhizae are subject to change based on the season, species, and age of the plants involved	Shifting relationships (6)
Transfer of both defensive and offensive chemicals between plants	Exchange of information related to the states of the plants (7)
Many mycorrhizae are saprophytic (consuming dead wood), and are able to extract micronutrients such as minerals from the soil	Accessing unavailable nutrients (8)
The network structure of mycorrhizae allow flow from point A to B along multiple paths	Network redundancy (9)
The mycelium of individual mycorrhizal fungi will regularly fuse when they encounter other mycelium, even of different species	Networks are modular but directly connected (10)
Nutrients and information are transported down concentration gradients	Negative feedback for resource distribution (11)

Table One: Mycorrhizal Biological Strategies and Design Principles

We have compiled a table formalizing some biological strategies employed by mycorrhizae to facilitate symbiosis and strengthen communities, as well as the design principles which they illustrate. The design principles are numbered for reference

resources, time, money, information, skills, staff, etc), and their yields (physical resources, money, information, services, community, etc). The relationships between stakeholders include relationships with their audience/customers, partner organizations, legal relationships, business relationships, collaborators, and others. Understanding these states, the infrastructures of food systems stakeholders, is the first step in leveraging those infrastructures to reduce the value, information, and stock disconnects present in the food system (DP 7).

To build the FN, we must identify critical players in the food system in terms of their network connectedness (1). These players, like the trees with the most extensive root and mycelial networks, are the most important long-term partners; collaborating with established players will yield the highest dividends. However, the size of these players also gives them complexity, and a diverse array of strategies must be used to network with them effectively. The strengths of these players are used to help nurture less-connected players (11). Focusing on the most connected players introduces both reinforcing and balancing feedbacks. By leveraging the strengths of the most connected players to create connections with less developed players, a reinforcing feedback increases the connectivity of the system as a whole. At the same time, a balancing feedback ensures that connectedness is distributed evenly throughout the system, preventing oligarchy. Additionally, it is always the MN which must expend energy to make first contact with its partners. Thus, when contacting food organizations for collaboration, we must balance their long-term value with our experience and ability to understand them. We need to identify players that are both productive and accessible. Once we have identified such a stakeholder, we visit them in person in order to collect information about their state and relationships (DP 5). Most organizations already have spent energy discovering and reaching out to organizations for points of collaboration, and one of the unique values of the FN is to serve as a repository for these pre-existing networks, building a larger and larger network modularly (10), much as different species of mycorrhizae will associate with one another when connecting unrelated plants.

The FN is easy to expand. Once a relationship has been established with a food systems stakeholder, their network is studied in order to identify similar stakeholders (2, 3). It is important for the FN to have strong connections with the strongest producers in the food system, but it is also important to visit the far reaches of the network, expanding from nodes which are not well-connected (4). This diversifies the stakeholders which are present in the FN, and also allows for the nurturing of small stakeholders (11). After collecting information from stakeholders visited, the FN shares details of other stakeholders with the stakeholder being visited (7). Then, the FN can start nurturing existing relationships and facilitating new relationships between stakeholders. The most fruitful relationships to nurture will be largely self-evident, since the FN will have a thorough understanding of the goals, values, needs, yields, and network of the individual stakeholders involved (3, 7). The FN has an active and a passive component. The passive component is analogous to the MN's transfer of messages down concentration gradients, and is the identification of food systems stakeholders which might benefit from contact, based upon what is known of their needs, yields, and networks. The active component is analogous to the MN's ability to

"Why do systems work so well? Consider the properties of highly functional systems . . . Chances are good that you may have observed one of three characteristics: resilience, self-organization, or hierarchy."

-Donella Meadows, Thinking in Systems

obtain nutrients inaccessible to plants (8), and is our ability to facilitate interactions between food systems players that are in line with the interests of the food system as a whole, and to expend our energies behind the scenes in using mycorrhizae-inspired design thinking to design innovative solutions for stakeholder needs. The passive component of our operations makes FoodNet a networking service, while the active component makes us a biomimicry design thinking consultancy.

Like the trees in the forest, the states of stakeholders in the food system are constantly changing. The FN must be sensitive to these changes (6). This can be achieved by maintaining connection with food systems stakeholders, as well as learning about the cyclical processes which impact the stakeholders. In many cases, this may be accomplished through regular in-person visits or phone calls. However, just as mycelial cells may invade roots of large trees, for the most significant stakeholders in the FN, the FN should be incorporated into their infrastructure so that the FN can be responsive to changes which may affect a large section of the food system (5).

A significant challenge in implementing the FN is the scalability of the project; in such a complex and changing food system, storing information in a meaningful way becomes more and more difficult the larger the FN becomes. Again, MNs provide guidance in addressing this challenge. MNs exhibit specificity, modular character, and appear similar on all scales (4, 5). These attributes can be understood most easily by studying boundaries and interfaces. At a small scale, a single mycelial cell is interacting with neighboring cells. It's behavior is largely determined by the inputs it receives from its neighbors. To optimize a cell's behavior, the needs and yields and connections of the cell and its neighbors are noted. To identify points of fruitful connection with nearby cells, the needs and yields are accounted for; a cell will not network with a neighbor if the interaction is not beneficial for both cells. Similarly, the mycelium will network two plants together if the needs and yields of the plants and the mycelium match well. However, in order to create a network between two plants, it is unnecessary to account for the states of the individual cells in the mycelium, and so the two systems can be addressed separately. The states of each individual cell do not need to be understood in this case because the flows between them are internal to the larger system, and in conjunction contribute to the net needs and yields at the boundary between the mycelium and the plants. The needs and yields at this interface is what is relevant to the network between the plants, just as the needs and yields at the interface of the mycelial cells are what is relevant to the network between them. This is what is meant by 'modularity' in the MN. One can continue to zoom out on the system to discover new large-scale systems which interact at different boundaries.

We will use the GrowHaus, the Denver seat of the Colorado Permaculture Guild, as a case study to help explain how these concepts are implemented in the FN. The vision of the GrowHaus is "to catalyze a neighborhood-based food system in our community that is healthy, equitable, and resident-driven." They achieve this goal through food production, distribution, and education. The power of the FN increases when implemented at multiple scales. At the scale of the GrowHaus itself, using the FN model allows the various values and initiatives of the GrowHaus to operate collectively. Understanding the relationships within the GrowHaus will allow us to understand the needs and yields of the organization as a whole, to create effective relationships between itself and its collaborators, and identify points of connection with other networks. In this manner, the scale can be expanded to include the network of organizations promoting food justice in the Denver metropolitan area. When we expand system boundaries to contain multiple subsystems, we

extract the needs, yields, and relationships that interact at the boundaries of the subsystems in order to determine how the subsystems interact with one another. In this manner, the vast amount of information contained in the system as a whole is modularized and made more accessible. We can imagine that different members of our group focus on different scales of the food system such that those of us who focus on the individual organization scale can inform those of us who focus on the community scale. By modularizing the information in this manner we are able to integrate development with growth and mirror how the mycorrhizae behaves at boundaries.

During a workshop at the GrowHaus, 10 Biomimicry members used over an hour of our time to learn about the needs and yields of the GrowHaus as well as the network which they have developed in the Denver area. This was an important feasibility test of the FN which allowed us to see how the idea looks in practice. Kelsey Simkins, our guide at the GrowHaus, was excited about using the FN concept as a means to connect different networks in the food system. She observed that although every organization is engaged in networking and that these networks benefit the entire food system, the system is so vast that new players are always being encountered; she believes that a networking service which is able to link together pre-existing networks would prove extremely fruitful for the GrowHaus and other community-oriented organizations. She graciously shared her network with us and discussed the needs and yields of the GrowHaus which could serve as points of collaboration with other groups. The results of this brainstorming session can be seen in the additional images.

We learned important lessons from this workshop at the GrowHaus. First, it demonstrated that there is a wealth of players in the food system, such as the GrowHaus, Denver Urban Gardens (DUG), and local schools who are interested in using mutualism and collaboration to bolster the food system. Second, we learned that food systems organizations are active in building their own networks to achieve these goals, but organizations recognize a need to link networks together in order to find points of collaboration that wouldn't be possible otherwise due to the complexity of the food system. Lastly, we learned what the FN could look like in practice- just an hour of brainstorming on this topic with Kelsey yielded a good description of their needs and yields as well as a network graph which points us in the direction of future points of contact, such as the organization Re:Vision, which shares the vision of the GrowHaus but has different successes and challenges.

Business Case

We seek non-profit status to implement the FoodNet. This is because, although we are providing value to individual stakeholders, we are also providing a public good and bolstering the food system as a whole. Non-profit status will make it easier for us to seek governmental and other grants and private donations, and fits the long-term ethos of the FoodNet as an organization seeking to close the value disconnect in the food system. The FoodNet will benefit from these sources of capital, especially in the beginning, because as the MN must expend energy to make first contact with plants, we must invest our time and resources into understanding food systems stakeholders before we can provide them value. For this and other reasons, we also

prioritize the personal and professional development of our consultants. Just as the mycorrhizae values the success of the forest over individual trees, the FoodNet is a long-term initiative that will provide immediate value but which becomes more valuable as it integrates development with growth. The quantifiable value of the FoodNet results from the closing of the information disconnects (through consulting) and stock disconnects (through facilitated resource transfer).

In order to immediately begin executing on key elements of this business plan we have identified two steps which intend to legitimize our group. Firstly, group members will organize and reach out to existing networks comprising players in the food system. Upon identification, these players are researched and contacted to establish communication and gain basic insights. We can use the networks we already have to identify groups to contact first, such as the network shared by the GrowHaus and the Sustainable Eiber Network, a neighborhood sustainability initiative Eliot's mother helped form in Lakewood Colorado which has served as a model for similar groups nationwide. As we communicate with nearby networks, we can identify key opportunities to capitalize on first. To determine this, we will be considering a variety of elements of these networks including mission statement, team, customer base, open resource loops, challenges, and current partnerships. Over time we will likely find many new areas that would benefit from collaboration and would add information on the members of our network accordingly. Our second step, which occurs in conjunction with the first, is legitimizing FoodNet as a non-profit. Initially, this will consist of the definition of team roles and organization, the creation of a informational website and email, and outreach to students and community members that would like to participate. Ultimately, this will culminate in the official filing for a non-profit status. With the vision of our executive team combined with insights we gain throughout the initial phase of legitimizing and expanding our network, we will be able to seek out additional funding sources such as grants that we can use to market our concept and reach an ever more inclusive network. We will be able to begin generating revenue once non-profit status is achieved and opportunities within the base network have been identified.

About Us

This team is composed of current CU-Boulder students and May 2015 CU graduates whose shared interests bring us together at meetings of Boulder Biomimicry, a student group we have led since its inception in Fall 2014. Our weekly meetings are led with the philosophy that with patience, curiosity, and free spirits, we can develop new ways of relating to our world. We consciously prioritize happiness and friendship at meetings; this leads to higher productivity as people are more intrinsically motivated to learn and take action then they would have been if our meetings were business only. Biomimicry, and the friendships that it has fertilized, are our way of forgiving our misgivings with humanity, entering communion with Gaia, our home, and using this serenity to confront our challenges in a balanced and loving way. The development of this idea has helped us to forge a bond that will continue to strengthen regardless of our success in the Design Challenge. We believe in the power of this idea, its feasibility for us as a team, and its potential for expansion, and will continue to develop our network because of the positive impact we know will result.

This project would not be where is was without the generous contributions of all the participants in the Biomimicry meetings and events. Although the current formalization was created by the core 5-person leadership team, it represents an extensive collaboration by many more from a wide variety of academic and personal backgrounds. The core team is a close group of friends comprised by Eliot Kersgaard,

Braeden Miguel, Ted Thayer, Elena Hansen, and Dominic Fraser.

As in any successful team, individuals excel in areas for which they have the most interest. By respecting people's natural strengths and passions, we will fulfill the specific duties in areas such as execution, outreach, marketing, and scales of partnerships. Initially, our roles include business strategy, nature inspired brainstorming, communicating the mission, and prototyping. In our current design phase, all group members discuss and execute all roles. This way, people have naturally focused on areas they are most interested in. Due to his strength in integrating collaborative systems level problem solving with team leadership, Eliot is the leader and creative architect for the FoodNet concept. With an eye for design, Elena has been drawn to how the mission is communicated in all mediums and our organization's representation. Braeden, an entrepreneurial-minded innovator has refined the business concept and vision for media representation. Dominic's interest in interpersonal relationships and study of social dynamics helps create the collaborative environment to connect stakeholders. Finally, Ted has integrated his passion for projects through creation of long term strategy for executing and legitimizing the consultancy that networks food systems. These current roles are free to evolve and change as group members apply their unique abilities to different areas. By combining independent work and group ideation, we have a strong collaborative and efficient team fully capable of solving difficult challenges to create FoodNet.

Our group is itself a working prototype of the FoodNet strategy, serving as a template which we can adjust and expand to incorporate other entities in the food system. With our wide variety of strengths and priorities, our diversity promotes diversity in the food system as a whole. The value in this is that many inputs lead to more opportunity for growth and collaboration than would otherwise be expected. The lessons learned from mutualism, and particularly the community driven adaptations of the mycorrhizae, have proven valuable in learning how to improve the functioning of our design team. Group decisions and projects are made first and foremost by allowing the individual strengths of our members to shine, and then through a process of explicitly discussing areas of weakness and how to leverage our shared capital to fill in gaps.

The "FoodNet" concept (community building from the natural inspiration of Mycorrhizal networks) could manifest in many different styles, formats, and topics. The concept can be applied to many systems, from families and farmers to governments and corporations, ecosystems, continents, and oceans. Different groups, coming from many backgrounds, may adapt and extend these ideas; this process allows for ever more connections to be made between far-flung relations and allows the strategy to improve. As these networks build upon each other to minimize inefficiencies, integrating with groups with similar or identical business approaches is a benefit instead of a hinderance. Ultimately, our current food system's disconnect is mirrored by cracks which permeate and divide all of society; reconnecting ourselves with nature as a guide creates resiliency, diversity, and efficiency, and leads to a sustainable future.

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