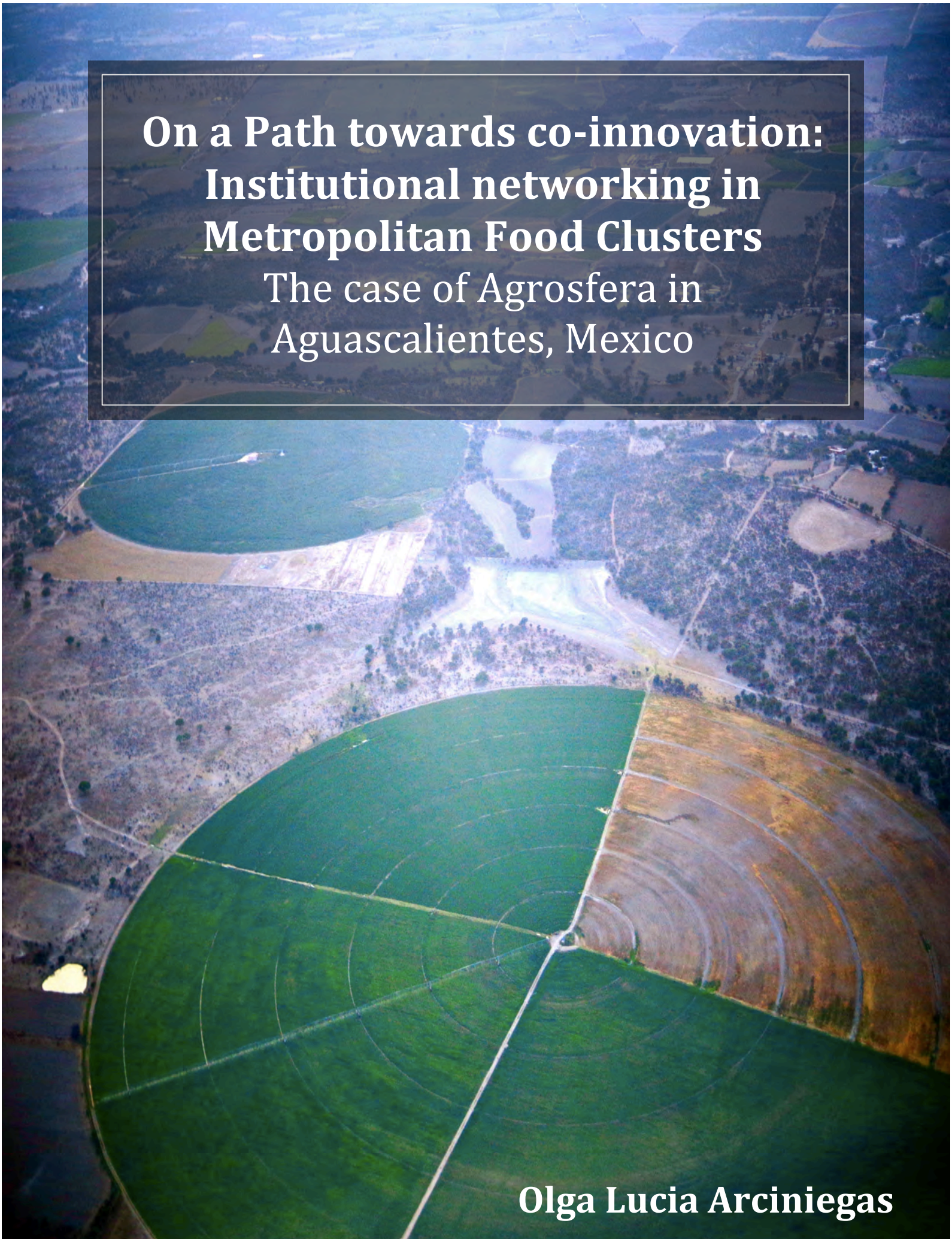


On a Path towards co-innovation: Institutional networking in Metropolitan Food Clusters

The case of Agrosfera in Aguascalientes, Mexico

Olga Lucia Arciniegas

On a Path towards co-innovation: Institutional networking in Metropolitan Food Clusters

The case of Agrosfera in Aguascalientes, Mexico

August 2013

Author:
Olga Lucia Arciniegas
Student no. 4170245
Human Geography
Specializaton: Globalization, Migration & Development
Nijmegen School of Management
Radboud University Nijmegen
The Netherlands

Supervisors:
Dr. Lothar Smith
Department of Human Geography
Radboud University

Dr. Peter Smeets
Alterra Research Institute
Wageningen University

Preface

The time I spent living in the Netherlands was an enriching and enlightening experience that has generated new life objectives. As a master student enrolled at Radboud University, I was fortunate enough to take classes taught by Dr. Lothar Smith and Dr. Arnoud Lagendijk, among others, which were fascinating and structured in a way that allowed for critical thinking and creative inquires to manifest. Topics regarding economic geography and global food chains divulged my curiosity and set the framework for the research ahead. I am grateful for my thesis supervisor, Dr. Smith for giving me the freedom to be the "captain" of my own research and for his insightful commentary that gave my incoherent babble a more concise demarcation between practical thought and theory. Although I was conflicted with the precise application and scope for a research project, my aim was to gain insight into socio-economic issues pertaining to geographies of food consumption and production and so I was eager to expand my cultural horizons and apply academic insight to these real world issues. The team at Wageningen University, who I completed my external internship with, provided the resources and circumstance for me to examine the role institutional actors play in achieving a sustainable Metropolitan Food Cluster in an emerging economy.

My involvement in such a project would not have been possible without the trust bestowed upon me by Dr. Peter Smeets. His expertise in industrial ecology, world affairs and regional development has helped me gain valuable insight to expand my own career and personal goals. I would also like to express my gratitude to Dr. Madeleine van Mansfeld. Her determination, confidence, bravery and zeal for life is truly inspiring. I am deeply grateful and honored to have had the pleasure to work alongside such intelligent, resourceful leaders that push boundaries and are passionate about their work. Last but not least, I would like to thank Andrés Martinez Garay who was my greatest distraction and most encouraging critic.

Table of Contents

List of Figures

List of Tables

List of photographs

List of Acronyms

CC	Consolidation Center
CoP	Communities of Practice
CEAA	Consejo Estatal Agropecuario de Aguascalientes
FOCIR	Fondo de Capitalización e inversión de sector Rural
IA	Integrated Agropark
IAN	Intelligent Agrologistic Network
INEGI	Instituto Nacional de Estadística y Geografía (National institute of statistics and geography)
INIFAP	Instituto Nacional de Investigaciones Forestales, Agricolas y Pecuarias (National forestry, crops and livestock research institute)
KENGi	Knowledge-Enterprise-Non-governmental-Government actors
MFC	Metropolitan Food Cluster
RTC	Rural Transformation Center
SEDRAE	Secretaria de Desarollo Rural y Agroempresarial

1. Introduction

1.1 Social Dynamics in Metropolitan Food Clusters

After back-to back business meetings in hotel conference rooms and long presentations laden with technical terms, interested participants and potential stakeholders of a Metropolitan Food Cluster (MFC) project called Agrosfera in Aguascalientes, Mexico, came away with a more comprehensive understanding of what an MFC is and how it can be an innovative system design for the agricultural sector in their state. While the practical knowledge gained contributes to incentivizing project creation, one of the most powerful mechanisms for project success involves the social relations which formed and blossomed over the week-long exchange. Fruitful dialogue during an afternoon stroll, a much-needed joke in the hotel lobby and sharing a meal at a local hangout were valuable, face-to-face interactions that enabled more intrinsic levels of human connection to take shape. The participants in these gatherings were able to share information and garner new insights about each other and the ambitious project through a meaningful communication exchange that helped build cohesion and encouraged future partnerships in the emerging Agrosfera network in Aguascalientes (AGS).

No one would deny that social interactions are fundamental for building dynamic relationships that help achieve personal and professional achievements. Actors linked by common objectives or ties form complex systems of bonds that are structures of interpersonal communications called networks (Luna, 2010). No matter if it is a group of businessmen pondering a high stakes investment or a street vendor seeking out new territory, a certain amount of trust and respect needs to be established with others in order for successful results to manifest. As we approach a world population exceeding seven billion and the speed of new technologies pushes forth a new era of globalization, social coordination among actors is becoming more interconnected, competitive and imbalanced. As a result, the increasing complexity of networks has profound implications for society. In the agricultural sector of Aguascalientes for example, the network of some small-scale farmers has begun to expand in an array of dimensions. With greater international competition and food price volatility, a small, family owned, commercial farm that has been using the same production methods for generations now has to expand its network to stay afloat. This may be done by contracting new suppliers, adopting better technology, joining a farmer's cooperative for better leveraging power and/or sending off the young to urban centers where they will receive more opportunities. Indeed, networks can range from the small and intimate family connections the farmer has on their parcel of land, to a greater and more complicated set of contacts they may have as a producer in a global commodity chain. Exploring the complex mechanisms of one of these said networks may shed light on the dynamics of their participants, their power relations the structural manifestations that continue to transform the landscape of Aguascalientes and beyond.

Like every other country in the world, Mexico is experiencing the effects population growth, urbanization and the growing use of telecommunication has had on our virtual

and physical landscape. As this reconfiguration of space continues, so do the unfavorable consequences. The importance of finding innovative solutions to challenges relating to urban sprawl and resource degradation, for example, cannot be understated. Metropolitan Food Clusters (MFCs) are geo-spatial arrangements that address these concerns and researching the social networks of these systems can optimize their effectiveness. The claim of this thesis is that social networks and their cultivation are crucial for the development of a Metropolitan Food Cluster. By examining the role different institutional stakeholders play in creating an agro logistic network system, a better understanding of their specific needs and challenges will be reported in order to help system schemes be more effective, resilient and competitive. This is the reason why I have chosen to study an agro-industrial geographical cluster concept called Agrosfera in Aguascalientes, Mexico that aims at sustainable development for my empirical analysis.

Even though my focus is on the social processes of a MFC, it is important to comprehend its technical design and function. A MFC like Agrosfera utilizes the concept of industrial ecology to enhance the use of land-independent primary production in agriculture (Smeets, 2011). The three elements of an MFC are agroparks, rural transformation centers and consolidation centers, which will be discussed at greater length in Chapter 3. Agroparks contain clustered processes of the value food chain, such as greenhouses, storage and research facilities, will be the primary focus of this research[1]. Designing this system innovation requires many practical inputs as well as a wide range of participants from different fields and institutions to encourage the growth of social capital among the different institutional actors involved in an agropark. Like business leader Blaine Lee says, "when people honor each other, there is a trust established that leads to synergy, interdependence and deep respect. Parties make decisions and choices based on what is right, what is best and what is valued most highly". Although this assertion differs greatly from more traditional business models, I propose that human behavior and the interactions these actors have with one another shape project management tactics and the development of large-scale business ventures. My second conjecture is that there is a need to identify commonalities and address any obstacles that may hinder the development of relationship building for the successful execution of a sustainable MFC project. In the following sections, I will lay out my questions and what I hope to achieve with my findings.

1.2 Research Goal and questions

For this research, the goal is to provide insight on the development of social networks in an emerging Metropolitan Food Cluster (MFC) by gaining a better understanding of the specific needs and challenges of key stakeholders to help system schemes be more innovative and effective. Beyond investigating why MFCs may be especially applicable

[1] Research was conducted during a phase of the project when the primary topic of discussion in meetings, panels and brainstorming sessions were agroparks.

[2] A Community of Practice (CoP) is a type of informal learning environment with strong communication

for sustainable agri-food chain development that affects a global population and the role key stakeholders play in its success, sub goals include:

-Assess stakeholder roles and their contribution to the project
-Examine what builds alliances that lead to sustained growth of a MFC
-Pinpoint risks that may jeopardize the formation of a MFC
-Identify the difficulties institutional actors face that may inhibit successful network formation
-Expose the unique needs among stakeholders and why they would want to participate in a project like Agrosfera

To achieve these goals, a central research question has been developed and it is stated as such:

Which factors contribute and/or limit network expansion among stakeholders in a developing Metropolitan food cluster?

This central research question leads to the following sub questions pertaining to institutional network analysis, which have been formulated as follows:

*1. How do MFCs build trust with their business partners and maintain their mutually beneficial relationship (i.e. how to create **social capital**)?*

*2. Can the existing network expansion in Agrosfera lead to a **CoP** [2]?*

My hope is that exploring and reporting the findings of social processes within a MFC will contribute to their operative effectiveness. By improving the organizational capacity of intelligent agrologistic networks such as Agrosfera, we can be better equipped with tackling the conceptual underpinning of this research pertaining to the challenges of urban growth and unsustainability in the agricultural sector.

"We have to realize we are making the shift from a large scale industrial-technological paradigm to a more creative network way of thinking that is more adaptive to local demands as more global in its organization" -Rutger Schilpzand

1.3 Societal and Scientific Relevance

In order to investigate the role institutional networking has for the creation of an MFC in the developing world, it is necessary to understand *why* institutional actors would be interested in a sustainable agro-cluster in the first place. As processes of international integration continue to become more complex; economic powers shift, class disparities increase and the exploitation of natural resources continue to grow.

[2] A Community of Practice (CoP) is a type of informal learning environment with strong communication channels that inspire innovation

In a few decades, the number of inhabitants in urban centers will approach three quarters of a predicted nine billion people (Smeets, 2011), and the greatest urban population growth is in low and middle income countries as can be seen in figure one.

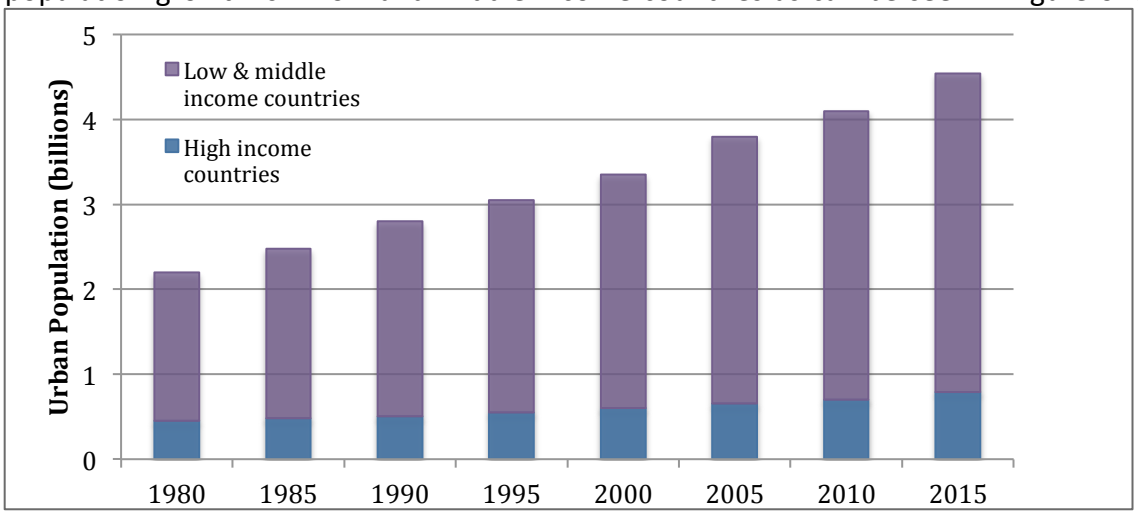


Figure 1: Urban population comparison in low, middle and high-income countries. Sources: Food and Agriculture Organization statistical databases (FAOSTAT); Country income according to World Bank 2005.

The swelling of urban centers puts immense pressure on the use of natural resources and the capacity of local infrastructure to meet the growing urgency for basic human needs like housing, food and health. Formal response mechanisms cannot keep up with the pace of globalization(s) effect on time and space transformation at the local scale and so the "highly eclectic and sometimes chaotic pattern of growth produces a monumental public agenda...little of the subsequent growth is properly planned or regulated" (Muller, n.d, p.282). This can have severe consequences on the social and economic-spatial processes of an emerging city. This is especially true in developing countries where urban growth patterns are steadily rising but do not necessarily produce economic advantages that improve city infrastructure, housing availability or job growth.

Indeed, the rise in world population has even led to a change in food consumption patterns and transformed the landscape of urban centers. The consequences include, but are not limited to, greater disparities among social classes, overcrowding, health risks and ecological damage. Additionally, new market dynamics have also shaped the world food system as the rise of buyer power (retailers, processors) has increased. The shift from producer-driven chains to buyer-driver chains has tremendous consequences on the concentration of capital, economies of scale and the future of agricultural practices (Morgan, 2009). Furthermore, this power imbalance has marginalized farmer rights and places barriers to smallholders wishing to compete in the world market.

In short, urbanization and changing power structures in agricultural chain linkages have increased interest in exploring innovative food systems. It is crucial to come up with solutions that mitigate such negative effects by developing global agri-food chains and agro-enterprises that generate sustainable growth. In an era where corporate gluttony and environmental degradation is commonplace, it is no wonder that emerging

economies wishing to compete in the global arena are trying to find innovative solutions that protect their most valuable resources; their land and people. This research aims to shed light on the structural formation of networks in an innovative MFC concept that addresses the aforementioned issues we face as a society.

The system design of an MFC is based on a transdisciplinary approach that applies the principle of industrial ecology and aims towards sustainable development (Mansfield et al., 2012). Broadly speaking, it is a cluster of agro- and non agro-functions on or around a location. The basic principle of clustering is the observation that the firms which operate close to related firms and supporting institutions are often more innovative and therefore, more successful in raising productivity than firms who operate in isolation (Nogales 2010, p.64). These advantages lead to enhanced competitiveness and facilitate the opportunity for creation innovation. Some of the most important benefits that spatial proximity provides is the potential for improving the local economy by generating employment and promoting linkages between partners. Furthermore, it has been shown that clusters promote an active dialogue between private and public sectors that foster new policies and support institutions (Nogales, 2010). According to the FAO, clusters in the agri-food sector represent a minimal percentage of clustering initiatives and an even lesser percentage accounts for agricultural cluster projects being undertaken in developing countries (Nogales, 2010). The insights gained through this research project will contribute to the formation of best methods and management practices in forging alliances among stakeholders within agricultural clusters. The analysis of capacity building in MFC design is very innovative and available literature for reference is somewhat limited. While this may bring on certain challenges, it is also a testament to the creative will of project participants as well as the need for such research to be implemented. The results of this examination may help future institutional actors within MFCs like Agrosfera adopt effective strategies and forge synergies that are long lasting.

1.4 Structure

The first chapter elaborates on the context of the subject and presents the link between a rising urban population and the transformation of agro-food production networks. Goals and questions are postulated and research relevance is expressed. Chapter two examines the theoretical lenses associated with building a strong network among institutional actors in a business cluster. The theories discussed will include social capital, cluster theory and communities of practice. Chapter two will also give the reader some clarification as to why all of these theories help explain the emergence of Metropolitan Food Clusters and the network patterns that arise from the collaborative force of institutional actors involved in such projects.

Chapter 3 will cite a few examples of how urbanization has changed the food system. In the sections that follow, readers will be introduced to MFCs and how sustainable practices are being incorporated into their design. Furthermore, the section will briefly explain the design and operation of resource use efficiency practices which includes land independent production in closed systems, plant and animal decomposer-production processing, trade, R&D and education facilities that rely heavily on ethical

practices and of sustainable business strategies that strive to act responsibly towards people, planet and profits (Smeets, 2011). This industrial ecology model is manifested through innovation, state of the art technology and network formation; the heart of spatial clustering.

Chapter 4 explains the general approach that was used to obtain data. This includes the process of identifying key stakeholders, choice of research methods and the manner in which the interview questions were selected. I will use the term KENGi, which is the innovative formulation of collective participation among **K**nowledge institutions, **E**nterprises, **N**on-government institutions and **G**overnment actors (Smeets 2011). These key stakeholders are project managers and industry leaders that take on a decisive role in the implementation and proper strategic performance of MFCs. A descriptive account regarding the unit of analysis as well as the challenges that arose during the investigation will be mentioned throughout the text. The reader will also be introduced to Aguascalientes, Mexico, where the concept of a MFC is taking shape with the help of the collective influence of KENGi. The results of the study are presented in chapter 5. The reader will get a glimpse of who the stakeholders are, what level of influence they have on the project, and what an agropark means to them. This chapter also exposes the unique contributions or setbacks that enable networks based on the KENGi concept to form. This involves the results of a scale matrix, the risks and obstacles associated with their participation, stakeholder beliefs on how to build strong alliances and a SWOT analysis. Chapter 6 will interpret the most relevant findings in a manner that shows applicable results and suggestions will be devised based on the findings of the case study in Aguascalientes. The final chapter concludes the thesis by briefly recapping the general premise and offer recommendations for further research within this field of study.

2. Theoretical lenses

2.1 Introduction of theoretical approaches

To begin addressing the questions posed in this body of work, the framework of theoretical lenses associated with Metropolitan Food Clusters (MFCs) and network formation will be discussed in this chapter to guide and give structure to the observational analysis. Moreover, the theories will help clarify why this is a relevant contribution to the existing body of research. While many assumptions and propositions can be extrapolated from the following theories, my focus is to identify their relationship with networks and agro-production developments. I would like to clarify however, that the research questions and hypothesis of this study are not led by theory but instead, driven by the empirical patterns observed. In other words, the origin of the research topic is not tied to a specific theory or methodology. For this reason, the aim is neither to test a particular theory nor to use a new method to test known phenomena, but to have a richer understanding of why and how institutional stakeholders play a role in network expansion in a MFC like Agrosfera.

This chapter introduces the theory of social capital, which relates to relationship building in a network. It is the handshake of government officials, a nervous economist presenting data and the committed will of passionate delegates that give life to the realms of activity in networks. The second section of this chapter deals with the dynamic relation social capital has with building communities of practice (CoP). This section will also explore why co-innovation and knowledge exchange (important outcomes of a CoP) among institutional actors is particularly relevant in the creation of Agrosfera, which is an empirical example of a type of agro-cluster. The last section will highlight the theory of spatial clustering and how MFCs in particular, contribute to the development of a competitive food system in an increasingly urbanized spatial order (Nogales, 2010). To help explain how social networks may evolve in a system innovation like a MFC, we will first look at how they form and what they are comprised of.

2.2 Network Society and innovation

The overarching premise of this thesis is the analysis of networks. A network consists of a set of nodes with a set of specified ties that link them (Halgin, 2012). Actors in a social network can be defined as individuals, companies and even countries (Williams & Durrance, 2008). In this report, the nodes are institutional stakeholders with interconnected and indirectly linked ties to Agrosfera.

Photo 2 Mexico City

Characterizing the network structure and node position and relating them to group and node outcomes is much of what the theoretical wealth of network analysis consists of (Halgin, 2012).

According to sociologist Manuel Castells, the Network Society is the current phase of human development in which knowledge and communication technologies drive the formation of network systems worldwide (Castells, 2010). In this phase of human history, linear, measurable and irreversible time is "using technology to escape the contexts of its existence" (Castells, 2010, p.464). While social theorist debate over the concept of time, many would agree that the network society and globalization are closely related and both transform spatial realities pertaining to social organization. As David Harvey suggests;

'we can argue that objective conceptions of time and space are necessarily created through material practices and processes which serve to reproduce social life(…) It is a fundamental axiom of my enquiry that time and space can not be understood independently of social action.' [3]

Digital communication and network diffusion account for the flexible and adaptable organizational forms that shape the processes of social action. Although the concept of a network is an old form of social organization, the microelectronics and digital communication channels that process, store and transfer information have revolutionized the way modern global linkages take shape. Within the social structure of this contemporary "connected" society, family members in different continents can now communicate with one another in real time, crafty entrepreneurs can sell their wares to a global online community and lectures from a well renowned university are accessible to millions worldwide. Methods that allow these sorts of transactions can be performed in networks of smaller regions and in the space of flows, where the boundaries of physical contiguity are no longer bounded structurally (Castells, 2010). The compression of time influences all domains of human activity and has reorganized food production and distribution practices. The rise of industrialized farming, mass consumerism and the application of biotechnology for agricultural advances, for instance, has globalized agro-production and incorporated it into the three different layers that make up the space of flows. According to Castells, the space of flows consists of 3 layers: Electronic networks that form the basis of the simultaneous practices of information and communication flows into the network. For example, online cargo tracking and cloud computing for inventory control. The second layer consists of hubs and centers that embody the specific places that deal with the decision making processes, organizes the division of labour and have other well defined functional characteristics such as test labs, manufacturing sites and MFCs. The third layer refers to the elite, cosmopolitan actors with free mobility and who control the decision making process in hubs and nodes (Smeets, 2011, pg.52) in a MFCs, these actors would be considered the stakeholders.

Not only does this affect the processes of time and spatial constructs, this new social

[3] Harvey D. (1989). The condition of postmodernity: An enquiry into the origins of cultural change. Blackwell, Oxford, UK: 204.

morphology reconfigures value systems and cultural norms. Studies show that the most advanced locations in the highly integrated society of the 21st century are those which can achieve innovation, generate new ideas and raise productivity, whilst regions lacking these resources tend to be less productive (Porter, 2008). As the world continues to transform and the web of interconnections grow more complex, the adaptive capacity of people and businesses is significant in determining their position in the global economy. A MFC is an intelligent agro-logistic network system designed and operated by institutional stakeholders that work together for a common objective, which is to meet the food needs of a growing urban population in a sustainable and innovative manner. They exemplify modern farming practices shaped by processes of globalization and their capacity for innovation creation which function in the space of flows. If this line of thinking holds true, then their implementation may be heavily determined by the social ties- or networks-of the stakeholders involved.

Value Network is the aggregation of:

Vertical relationships among suppliers of raw materials and production inputs, agricultural producers, processors and exporters, branded buyers and retailers;
Horizontal relationships among producers, which take form of growers' cooperatives or various types of smallholder business consortia;
Support relationships between producers and facilitating organizations (e.g. local governments, business service providers, research institutes, universities and non-government service organizations) that reinforce the quality, efficiency and sustainability of the chain.

Figure 2: Value Network, Nogales 2010

2.3 Social capital in value networks

The notion of connectivity constitutes various capacities in civilization's time space continuum and the role value networks have in the development of MFCs is the embodiment of such forces. Value networks seek to "trace the circulation of power through wider and more complex sets of social relations both within and beyond the state" (Jessop, 2004). Often times, people act to maximize their own utility, but research into managing change through learning in communities and agricultural businesses has highlighted the importance of relationships between people to the quality of outcomes experienced by communities, businesses and individuals (Kilpatrick, 2003).

In essence, an ideal value network encompasses vertical, horizontal and support linkages that depend on one another to thrive and increase mobilization as can be seen in more detail in figure 2. In these value networks, acting collectively and nurturing relationships seems to have a significant impact on innovation schemes and economic performance that affects all of civil society (Kilpatrick, 2003, p.501). A critical component of value networks is social capital, which emerges when people work well together and ideas are exchanged. As a social coordination mechanism within a value network, the development of social capital seeks to draw down resources and power to understand and develop markets, political and horizontal networks, and build coalitions or social movements (Vorley, 2002 p.38). To capture the benefits associated with value networks, actors initiating the system design of an MFC have developed the KENGi concept to highlight the importance collective alliances between **K**nowledge

institutions, **E**nterprises, **N**GO's and **G**overnment have with increasing the potential of trust-based relationships and cultural capital formation. It is claimed that the social relations these KENGi stakeholders have with one another are important in the overall success of a system innovation (Smeets, 2011). Nevertheless, the trajectory of the innovation process is unpredictable due to the instability and impulsive nature of inter-human relations (Leydesdorff, 2005). Although mutual interests may be a catalyst for interaction, individual pursuits take reign in most inter-system negotiations and if common ground is not met, hostility, broken ties or a halt in progressive reform may take shape. Using social capital theory as a conceptual tool to connect how microstructures (institutional stakeholder alliances) generate macrostructures (Agrosfera) puts economic rationality in a social context (Williams and Durrance, 2008). If the quality of life for the inhabitants of the region is low, corruption is rampant and illness widespread, then the levels of productivity for economic activity will also suffer. Value networks are said to raise prospects for long term competitiveness and this approach is especially applicable in the agricultural sector in developing countries where the cycle of equilibrium[4] is thought to hurt poor rural farmers the most.

While there are many definitions and applications regarding social capital, the basic principal of value creation through social networks is present in all analogies. This view is supported by Etzkowitz (2011), which argues that frequent interaction, strong ties, trust and reciprocity- fundamental dimensions of social capital- must be formed in order for key resources, active dialogue and innovative capacity to truly manifest. "Despite its (almost) metaphorical character", ambiguity and lack of proper definition, the strength of social capital lies in that it brings together important sociological concepts such as value creation and capacity building in networks (Calridge, 2004). There have been no studies as of date to show the impact social capital has within a MFC and therefore, a central focus of my research. In a metropolitan food cluster, the advantage of physical proximity encourages frequent contact among potential stakeholders that may already have common goals and objectives. Social capital focuses on the value of relationships of individuals in a network which may create trust between them since it increases the efficiency of action, diminishes opportunism and reduces the need for costly monitoring (O'Brien, 2001). Like any form of capital, trust has value and is the base substance of innovation and creativity (Williams and Durrance, 2008). The idea of building trust however is intangible, like knowledge and organizational capabilities. Individuals encounter situations that build or break trust with other people in their daily interactions. From customer loyalty to domestic partnerships, being confident in the outcome of a said situation is what sustains a relationship over time (O'Brien, 2001). The willingness of stakeholders to commit to a project like Agrosfera before knowing the outcome is based on this simple, but powerful assumption. The anticipation of succeeding when there is so much at stake is based on an expectation about the positive actions of other people rather than a continuous assessment of evidence (O'Brien, 2001,

[4] Refers to "a cycle of equilibrium of low margins, resulting in low risk-taking ability and low investment which leads to low productivity, low market orientation and low value addition which in turn nets low margins (Nogales 2010 p.4)".

p.21). A potential stakeholder may be in accordance with a proposed plan but if the representatives spearheading the process have a poor reputation and they do not follow through on their goals, interest in the project may wane and a possible stakeholder is lost.

Indeed, "trust has enormous potential and low trust has great cost" (O'Brien, 2001, p.19). Since trust is a renewable, competitive asset that implies risk, it can be slow to build and easy to destroy. In some cases, all it takes is one broken promise or questionable behavior to lose trust. Studies (Li et al., 2009, Williams & Durrance, 2008) suggest that recurrent interactions between peers in a social environment can lead to the formation of social capital. So in order for people to cooperate with one another, they willingly ought to give more of themselves, which slowly builds trust. This occurs after repeated actions result in positive outcomes. Knowledge sharing and building can take place when strategic relationships are formed and new alliances can take shape when the social and technical resources that are available in the network are used effectively. Built on trust, the concept of a community of practice (CoP) addresses the opportunities a strategic network of different institutional partners can have on fostering innovation and knowledge exchange. In the following section, the CoP concept will be analyzed in order to deconstruct the effect it has on developing strong alliances among KENGi partners in a MFC.

2.4 Cultivating communities of practice

From organizing a neighbourhood block party to money managers trading commodities in the virtual world, the multi-layered interconnections we have with people and places comes in many forms and has a profound effect on the dynamics of society. As outlined in the introduction chapter of this thesis, the aim of researching Agrosfera is to explore the development of social capital in an emerging MFC. The organizational capacity among actors helps build a sustainable intelligent agrologistic network (IAN) that addresses issues relating to resource management and urban growth with relative participation levels ultimately depending on a number of communication and coordination strategies of diverse strengths and interests (i.e., social capital).

To investigate the potentiality of network development, "we need to know the dynamics, constraints and possibilities of the new social structure associated with it" (Castells and Cardoso, 2005, p.6). Consequently, this relates to the facilitation, integration and participation of the various actors involved (Smeets, 2011). Before any buildings get constructed, processing facilities start functioning, or routes get defined, social relationships need to form. Specific activities involving the creation of value networks among KENGi include: business planning, external relations, informal partnerships and risk management.

The process starts with actors sharing individual and scientific knowledge with each other (Kilpatrick and Falk, 2010). Whether it is an informal gathering or an exchange of emails, figures, stories, questions and/or goals, a combination of explicit and tactic knowledge helps increase the opportunities of interactive learning to support network formation, which is crucial for institutional change (Li et al., 2009). Studies have shown that sharing experiences and learning opportunities can help people make better-

informed decisions and encourage innovation (Li et al., 2009). Furthermore, an exchange of skills and interests may lead to new insights that enhance the quality and efficiency of productivity that is trying to be achieved. Universities that want to increase job placement opportunities for new graduates for instance, could team up with businesses that are looking for a better-trained workforce. Sharing needs and building a partnership could introduce mutually beneficial outcomes in the form of new curriculum, traineeships or scholarship funds. According to social learning systems expert Etienne Wenger, a community of practice (CoP) can facilitate learning and information exchange that can help participants (like the business and university mentioned above) achieve their objective. Essentially, any group of people that interact regularly who share a concern or passion can cultivate a community of practice (Wenger, 2012, p.1). CoPs are known under various names and range in content, size and recognition. While structural variation and function make it difficult to evaluate and measure effectiveness (Li et al., 2009), their conceivable potential to reveal a complex set of social relationships where social learning takes places can be useful in determining best practices for innovation in an increasingly complex and globalized network society. A group of farmers seeking to increase the yield of crop, a band of scientists working on similar problems and even a local street gang protecting their turf are all examples of CoPs. Efforts for a CoP largely depend on a basis of mutual trust and collective interest from participants as well as three essential elements that characterize its formation-a domain, a community and a practice (Wenger, 2012).

A CoP is not just simply a network of connections between people. It is comprised of participants that have regard for each others competence and are committed to their domain of common interest. By engaging in joint activities, meetings and discussions, they build relationships and learn from one another for the sake of that shared interest, thus forming a community. The third essential element is simply the characterization of participants as practitioners that share resources. People who participate in a blood drive or buy their produce at a farmers market are not in a CoP. A pleasant conversation with a stranger about tomatoes at a farmers stand may be interesting, but this interaction does not fall within the realm of a CoP. If, on the other hand, customers buying local produce decide to carpool to the market or have weekly dinners with their purchased items and discuss techniques, exchange recipes, and so forth, they are strategically making a concentrated effort to contribute towards “the shared repertoire for their practice” (Wenger, 2012 p.2). If learning through observation, interaction with experts and discussion with colleagues continually builds trust and social capital among KENGi stakeholders in Agrosfera, a CoP concept could potentially further optimize their function and effectiveness.

In a 2012 feasibility report conducted by Wageningen University, a CoP in a metropolitan food cluster consists of a “network of participants who have built up a social learning environment with each other…and are in a position to react autonomously and dynamically to changes that occur in the world” (van Mansfield, 2012, p.27). The ability for individuals and communities to manage and respond to pressures like urban sprawl and food price fluctuations depends on the “capacity, ability, organization, attitudes, skills and resources that communities have to improve

their situation" (Kilpatrick and Falk, 2010). Learning to manage change is stimulated by cooperation among participants that share and develop new knowledge, so the active existence of a CoP is an important goal for an emerging MFC like Agrosfera. There are many situations however, that hinder building social capital in this capacity. If a university seeking an alliance with a business partner forms tight bonds only with certain members, cliques or exclusionary actions may ensue. "Without proper monitoring, this closeness can hinder the acceptance of external input and the development of external collaborations" (Li et al., 2009). Conversely, potential institutional actors may get discouraged to get involved if the intentions of other more influential actors overshadow their own. Failure to include new members can weaken the growth and creativity of the CoP. Furthermore, while a CoP helps potential participants of MFCs improve their capacity to develop and share new knowledge, it is largely dependent on the integration and cooperation of a wide range of individuals.

Network formation for Agrosfera would ideally foster relations of all KENGi actors so integrating a wide range of voices in the process is pivotal in the formation of a heterogeneous community that consists of members from different disciplines and institutions. The reason why I am embarking on the investigation of social processes in an IAN is because of their potential as sustainable system designs. Allocating time, money and human capital on innovation helps emerging economies stay competitive and addresses concerns relating to urban growth and unsustainable food systems that affect the entire global community. Undoubtedly, there is a lot of literature out there that discusses the benefits of network formation, but little is said regarding the factors involved to make it possible. Uncovering the challenges and identifying the specific reasons why individuals would get involved in an MFC in the first place could lead to discoveries that contribute to the success of clusters in the agricultural sector.

So far, the discussion on network formation has focused on social capital, Communities of Practice and the influence trust and has on building value networks in an innovative system like a MFC. In the following section, the scope of complexities deepens with the analysis of cluster zones as geographical representations that utilize value networks for generating innovation creation and competitive advantage.

2.5 Cluster theory

Although clusters and networks are different concepts, they can be invariably linked through an integrated system of social processes. Networks can be found outside of clusters while at the same time, coalesce into respective clusters to facilitate the exchange of scientific concepts and tactic knowledge among stakeholders. First coined by economist Alfred Marshall and later adopted by scholar Michael Porter, the clustering of activities builds value networks that engage governmental institutions, universities, think tanks, and even trade associations which provide specialized training, education and technical support (Nogales, 2010). According to the Food and Agriculture Organization of the United Nations, a cluster can simply be defined as a geographical concentration of related industries, which gain advantages through co-location (Nogales, 2010 p.3). While a myriad of factors influence competitive performance, clusters promote internal and external linkages, which are comprised of actors seeking

to address common challenges and pursue common opportunities (Nogales, 2010). Similarly, while social networks facilitate the success of cluster zones, they also contribute to the shift in power relations among governing bodies. In order to achieve these linkages within a cluster, the support of external institutions are vital and act as vehicles for achieving this 'co-mingling', which changes the structure of firms and corporations within a cluster while enhancing the opportunity for innovation (Porter, 2008).

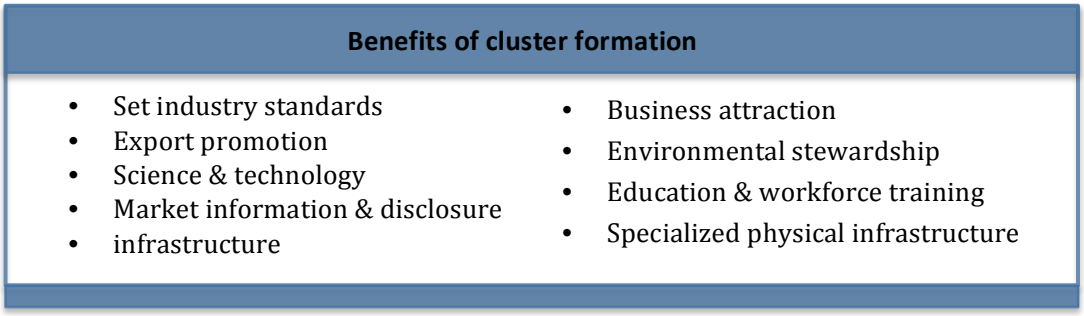


Figure 3: Benefits of cluster formation. Source: Adapted from Porter 2006

To further investigate the causes and implications of this particular model in agro-induatries, it is important to examine why clusters exist and expand. Scholars, policy makers and business leaders have paid particular attention to industry clusters as an important territorial phenomenon with 'mobile boundaries' that show the influence geographical proximity, value creation and social embeddedness (high levels of trust, identity and cooperation) have on the well-being of an industry or region (Porter 1998; Biggiero 1999; Belussi, Gottardi and Rullani 2003; Gertler and Wolfe, 2006). From textiles to electronics, clusters come in many forms and sizes (Belussi et al., 2010). While some of the most notable clusters include those in Silicon Valley and 'Tinseltown' (Hollywood), there are hundreds of clusters scattered across the globe representing a plethora of sectors. Clusters form value networks, which are comprised of suppliers, service providers, manufacturers and cross-related industries that integrate their resources for horizontal integration. According to preeminent cluster theory expert, Michael Porter, the collection of interconnected industries and institutions complement each other for their own advantages and the actors within these clusters have "efficient access to specialized inputs, services, employees, information, institutions and public goods" (Porter, 2008). While many agents function independently, research shows that clustering can present many benefits, which can be seen in figure 5, that enhance join-action advantages and agglomeration. Their strong association with innovative ideas, skills and new knowledge comes from the traditional business model of sustaining competitive advantage and concentrating their resources on a particular specialization.

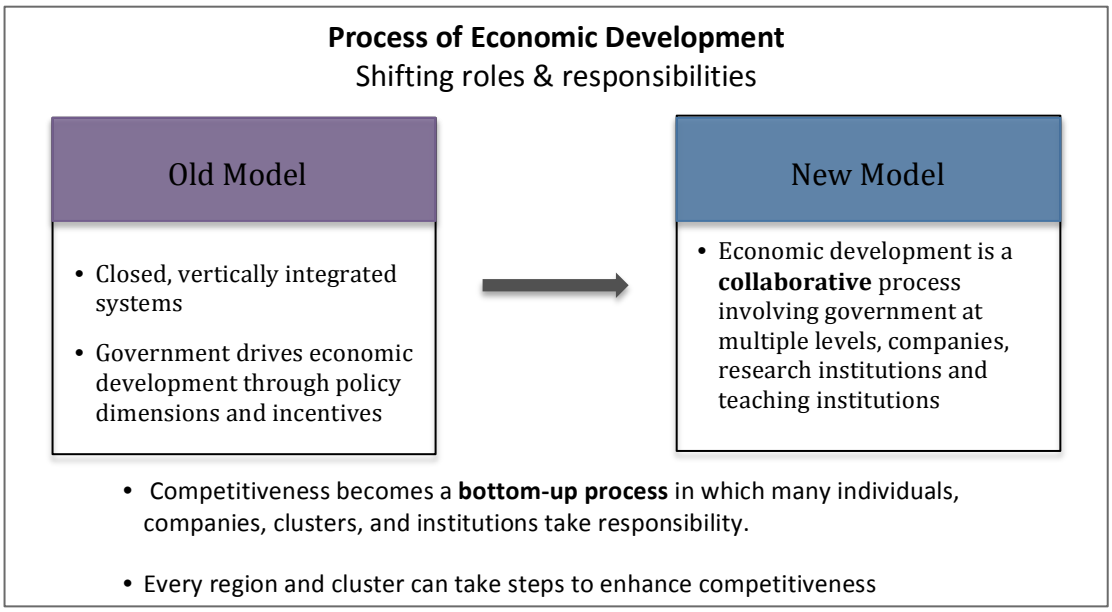


Figure 4: Shifting roles of economic development. Source: Adapted from Porter 2006.

Unlike old business models that relied on the government and functioned in a closed, vertically integrated system (see fig. 4), clusters fit along the space of flows as modern competitive strategies operating in multiple spatial constructs that rely on social and cultural interaction, enhancement of knowledge and the strengthening of external linkages (Porter, 2008). Some of the greatest challenges for developing countries wishing to gain market access and achieve high levels of productivity in the agricultural sector is to promote innovative practices and sustainable growth, while considering the livelihood of the inhabitants. The idea of a cluster as a vehicle for effective rural development, export expansion and opportunity creation has been noted by many experts in the field (Nogales, 2010, p.2). Nevertheless, "out of the 833 clusters analyzed in the Cluster Meta-Study[5] only 20 percent are from developing countries, of which less than 1 percent are agricultural clusters" (Nogales, 2010, p.10). Measuring productivity levels by economic indicators alone is one-dimensional and fails to address valuable inputs in the resulting prosperity of a region. In order to drive this system forward in the harsh terrain of the global competitive landscape, innovative practices must be placed as directive signs on the path towards social progress and change. Innovation however, takes work and it is a complicated process that entails strong partnerships and the collective action of participating institutions. Since innovation is linked to the competitive edge of a region and tends to concentrate in clusters, then their structural configuration could provide improved accessibility to a wide range of resources.

[5] www.isc.hbs.edu

2.6 Summary

Castells' Network Society is functioning in an era characterized by telecommunications and the internationalization of markets that has pushed regions to become more competitive. This globally embedded construct "consist of tangled webs of production circuits and networks that cut through, and across all geographical scales including the bounded territory of the state. It is through an analysis of the such networks- their participants, their interconnections and their power relationships that we begin to understand what is going on" (Dickens, 2011, p.52). Through the empirical investigation of the agrologistic network system (Agrosfera) in Aguascalientes, the complex, socioeconomic processes that interweave and are mutually constitutive become a palpable manifestation of an established global process.

In this chapter, clusters have been mentioned as an example of a business model encompassing modes of interaction on all spatial scales. They are an agglomeration of industries functioning in the space of flows to generate value creation via innovation creation. This is an issue of importance in emerging economies that want to expand their level of output while facing societal pressures brought on by swelling urban centers and class inequalities reaching new heights. The chapter also discusses the factors that make clusters so unique and incorporates the notion of a value network within their set-up. To demonstrate why relationships among people are important in the process implementation of value networks within a cluster, the theory of social capital was discussed. In order to build social capital in an agro-cluster project such as Agrosfera that is heavily dependent on the participation of various actors, a demonstration of trust, commitment, communication and the motivational will of the participants must be present (O'Brien, 2001). In a MFC like Agrosfera, not all participants will agree upon shared objectives and differences will undoubtedly emerge. While social capital facilitates coordination and co-operation for mutual benefit, it can also create exclusivity and clientelism (exchange of goods and service for political support) so it needs a balance between civil society and the state. As the CoP model suggest, the allocation of shared values is critical in coordinating a common agenda to achieve a set of goals that provide the greatest benefits for stakeholders involved. With the right factors set in place, alliances that may lead to the formation of a CoP can take shape when the social and technical resources that are available in the network are used effectively.

Before we delve into the original research that has uncovered findings regarding the social relations of different institutional actors involved in Agrosfera, Metropolitan Food Clusters and their relative characteristics that contribute to societal and scientific progress will be discussed in the following chapter.

3. Metropolitan Food Clusters in the Network Society

3.1 Opportunities in the space of flows

The growing interconnectedness in the world is seen with the increasingly urbanized spatial order of its nodes and hubs. Cities are inextricably linked nodes that play an important role in the global network (Sassen, 2002). Communication exchange for all business and government sectors between major cities like Tokyo and New York are commonplace and essential in the makeup of global connectivity. As cross-border transactions of all kinds grow, so do the networks binding particular configurations of cities. This, in turn, contributes to the formation of new geographies of centrality with urban nodes (cities) as the predominant linkages in the global circuit. These expanding cities experience a dramatic shift in function, demographic patterns, a general increase in communication technology and new socio-political movements that invariably link humans to the non-human world via a process of production. The management and servicing of the global economic system takes place in a growing network of cities that might best be described as having global city functions. As Manuel Castells explains, "the global city is not a place but a process. A process by which centers of production and consumption of advanced services and their ancillary local societies are connected in a global network (Castells, 2010, p. 416). Although the expansion of global management and servicing activities has brought massive upgrading and expansion of central urban areas, at the same time, large portions of these cities fall into deeper poverty and infrastructural decay (Sassen, 2002). In other words, while certain regions thrive, others struggle to keep up.

This does not mean, however, that these threats cannot be turned into opportunities. The implication here is not that MFCs are the answer to world hunger or that they will bring immediate prosperity to developing countries. They are simply a model by which active participants can explore innovative initiatives that help regions take advantage of emerging network patterns and interlinked communication systems enabling capacity building and adaptive processes to take shape. The case of Aguascalientes, Mexico is an example of how local authorities are utilizing global linkages to share information and learn from their industrialized neighbors on how to devise an urban system plan that addresses long term challenges. This chapter examines cluster initiatives in metropolitan regions that take into account resource management and socioeconomic inequality issues for sustainable growth. The first section of the chapter will explore the way urbanization-the conversion of land cover to urban uses[6]-has affected the space of places and the shifting consumption patterns of people in different ways. Then, an overview of what a Metropolitan Food Cluster is and how it forms an intelligent agrologistic network is provided. The integrative system of a MFC is further analyzed by exploring key mechanisms that allow it to be deemed a sustainable design. This means taking a closer look at what vertical integration and resource use efficiency practices look like in an agri-cluster like Agrosfera. Lastly, I will introduce the living, breathing

[6] Department of economy and social affairs, 2011

network system of Agrosfera- an embodiment of a MFC in the developing world- that is seeking to make a successful transition into modern production and tap into global knowledge effectively.

3.2.1 The rise of Megacities

In 1800, Beijing was the only city with a population of one million or greater. By 1900, 16 cities had reached this figure. By 2000, it was 378 cities. By 2025, experts say there will be about 600 cities of one million or more worldwide (U.N, 2008). Undoubtedly, the world is experiencing its largest urbanization in history, (Castells, 2010, p. 421) with the greatest urban population growth in peripheral and semi-peripheral zones. Latin America is the most urbanized developing region, with an urban population of 79% in 2009, which is higher than that of Europe (77%) and surpassed only by North America (86%) (Cadena et al., 2011). Alongside that, the form of urban land-use is qualitatively different from the past and shifting from highly concentrated to expansive peri-urban growth. Megacites of the past were compact epicenters of commerce, trade and culture. Now, global trends indicate that the growth of peri-urban locations, which house business centers, cutting edge art communities and even informal housing settlements, extend the spatial dispersal of linkages to reconfigure the organizational architecture of the global economic system (Sassen 2002). The number and complexities of services provided by municipalities cannot keep up with demands of expanding metropolitan regions and a number of qualitative and quantitative studies indicate it is a key issue in Latin Americas' development agenda (UN report, 2011, pg.128).

Although wide-ranging urbanization processes and adaptive responses vary from place to place, there is no denying that the food system is also changing as urban expansion grows. Hundreds of megacities all over the world will face tremendous food challenges over time and inadequate responses could have negative ramifications on the well being of their citizens and natural environment. With new consumer demands, shifting productions methods and greater land scarcity, food chains are being re-invented by the new local landscape and global economic connectivity. The issues of focus in the following section pertain to the effects urbanization has on food production and consumption patterns in urban socio-ecological systems. With a greater understanding of the effects urbanization can bring to the food system in global cities, the need of sustainable urban projects like Metropolitan Food Clusters can be better executed.

3.2.2 Inequalities in food systems and the urban space

First, we need to examine the new ecological thinking that has placed special importance on the relationship humans have with their city space. The affects people have on the ecosystem are more intensive than they have been in the past and a driving force of environmental change. The complex relationships human activity has with the natural world in a city space can be dubbed metropolitan socio-ecological systems, which are the "mutual interactions between social and economic activities in urban areas and the natural resources they depend on at multiple scales" (UN report, 2011 pg.

205). While deforestation, increased pollution and water contamination are typical environmental consequences of urbanization, faster shifts in these socio-ecological systems (e.g. urban sprawl) pose a risk on the welfare and infrastructure of urban domains, which directly affect the well being of inhabitants. A high concentration of people in a metropolitan area requires a well functioning system that has the capacity to offer basic goods and services in an efficient manner. With humans as components of the system, this open, dynamic and highly unpredictable environment is often regulated by external forces and non-linear system dynamics susceptible to change (Du Plessis 2008). New urban paradigms create land resource and local infrastructure constraints that propel the expansion of city boundaries.

As more people crowd metropolitan areas and the overall population increases, settlements expand outwardly and arable land decreases. Less land but more mouths to feed creates diseconomies of scale that traditional food systems must adapt to. In order to explore how food production is affecting the socio-ecological landscape of an increasingly urbanized spatial order and how consumers are affected by this change, we must define the food system and its primary processes. While there are many perspectives of what a food system is, the simplest definition describes it as a chain of (food related) activities from production to consumption (Ericksen, 2007). Table 1 compares some features of "traditional" food systems versus "modern" food systems that display how the material world (space of places) has autonomous identity yet forms a coextensive web of socio-spatial arrangements that have changed over time (Smeets, 2011).

Food system feature	**''Traditional'' food systems**	**''Modern'' food systems**
Principal employment in food sector	In food production	Food processing, packaging, retail
Supply chain	Short, local	Long with many food miles and nodes
Purchased food bought from	Small, local shop or market	Large supermarket chain
Nutritional concern	Under-nutrition	Chronic dietary diseases
Influential scale	Local to national	National to global
Main source of national food shocks	Poor rains; production shocks	International price and trade problems
Main source of household food shocks	Poor rains; production shocks	Income shocks leading to food poverty
Food production system	Diverse, varied productivity	Few crops predominate; intensive, high inputs
Typical farm	Family-based, small to moderate	Industrial, large
Typical food consumed	Basic staples	Processed food with a brand name; more animal products
Major environmental concerns	Soil degradation, land clearing	Nutrient loading, chemical runoff, water demand, greenhouse gas emissions

Table 1: Comparing some features of ''traditional'' and ''modern'' food systems Source: adapted from Ericksen (2007)

Modern food systems display the shift from local to global commoditized processes, which transcend national boundaries and are increasingly interconnected by expanding networks. In other words, they embody diagnostic characteristics of contemporary globalization (Dicken, 2011). With the various networks, nodes and environmental conditions that the food system relies on to function, it is no surprise that there are many different steps needed to get food from the farm to the fork which include, but are not limited to, processing, packaging, marketing, distribution and retail. Indeed, the intricacies of the agro-food world are staggering, so it would not be possible to dissect it

all in this research, of course. To get an idea of the ways spatial agglomeration in the developing world has impacted the food system and vice versa, we will primarily focus our attention to one part of the chain- consumption- and how it has affected food security for the underprivileged and affluent alike in urban spaces.

3.2.3 Changing diets of urban dwellers

With income, political and social power as strong determinants of food security, production and consumption patterns have changed with it. To meet the food needs of the modern urban consumer, large scale, agro-industrial facilities that source to global markets are now standard business operations. With pressure to integrate new technology and demanding standards for quality control, the global commoditization of food has altered agro-food production for the needs of urban consumers. Indeed, technological innovation and inter-firm cooperation have contributed to the increasing prosperity of agrobusinesses but the question remains whether the exponential growth in population, services and land usage ultimately results in uneven spatial spread that may pose severe setbacks for long-term city stability.

Given the economic opportunities and availability of services that a city provides, one would expect that the general urban population would have a higher standard of living and therefore greater access to healthy food. Unfortunately, "rapid economic development leads to large disparities in wealth rather than increased wealth for the population as a whole" (Leatherman and Goodman, 2005). City inhabitants grow less of their own food and so the mounting dependency on other sources exacerbates inequity in food distribution and allocation with food security being determined not on the actual availability but by its accessibility (Ericksen, 2007, p.236). On one hand, urbanites in the adequate income brackets push the demand for high value, food-imported products such as exotic fruit or gourmet cheeses, which implies more quality control, energy intensive production and import while on the other, poor city dwellers have incomes so low that they struggle to meet basic nutritional needs (Satterthwaite et al., 2010). As reliance on market food increases, cash poor households are likely to suffer nutritionally (Leatherman and Goodman, 2005). There are several dietary patterns worth noting however, that both the poor and rich urban dweller in the developing world share.

In response to longer working hours, a greater number of women in the labor force and reduced physical activity that is commonly seen in urban centers, inhabitants are more likely to eat processed and pre-prepared foods (Satterthwaite et al., 2010). This means a greater demand for quick, cheap products that are typically laden with preservatives, fat and carbohydrates. Consequently, this raises nutrition concerns for all urban dwellers, with some affected by malnutrition in some places and obesity in others (Ericksen, 2007, p.3). To provide an empirical example, Leatherman and Goodman note that many Mexican children typically buy a soft drink and snack during their morning school break. This cheap, readily available treat that can be bought at any corner store fills their bellies but offers little nutritional value and accounts for nearly 400 calories, about one fifth of an elementary school child's daily requirement.

Another common trend that urban residents share across the globe is the intake of a protein rich diet. The demand for meat in countries that have primarily subsisted in local staple items such as rice and potatoes has grown due to population growth and the purchasing power of consumers now able to afford higher value products. Figure 5 displays meat consumption per capita and compares three emerging economies that are experiencing tremendous urban growth and conversely, a shift in their eating habits. As the efficiency and speed of socio-economic activities deepen due to the worlds growing interconnectedness, so does the consumption of material and resource extraction in emerging economies.

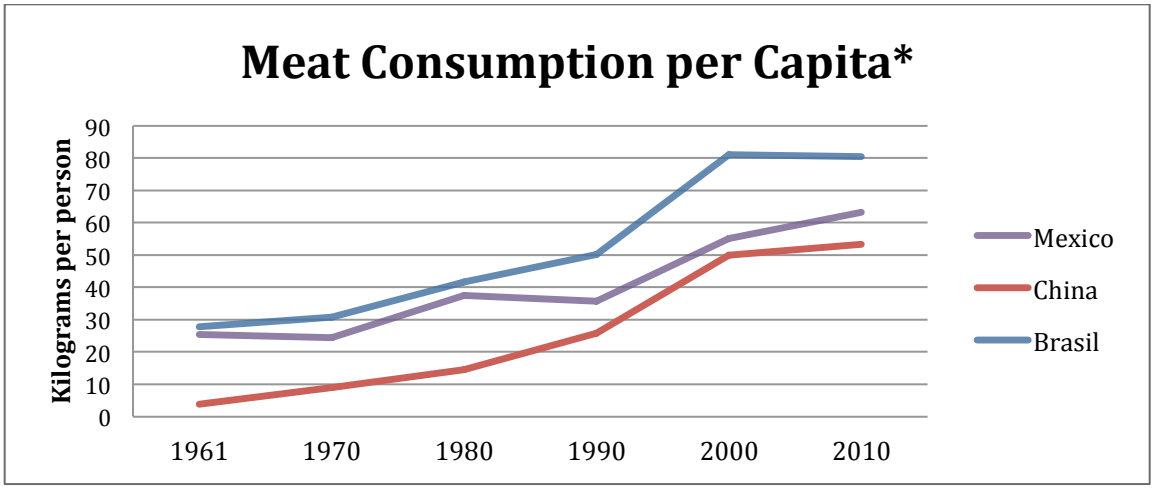


Figure 5: [7] *Meat consumption per capita*

3.2.4 Land Scarcity and urbanization

So far, I have given examples of how the modern food system contributes to issues of inequality and new trends in food consumption patterns for urban societies. Methods of adapting to the growing pressures of land scarcity and food security are being implemented worldwide. As the scale and function of cities continue to transform, so do the management strategies that appease the needs of growing urban centers. While a MFC is one system scheme that has been adopted to address these concerns, other response tactics are also being implemented. One adverse method that exemplifies how certain nations are handling their national food security will be discussed in order to give the reader an idea of the widely divergent paths the global community is taking to secure food needs of the future. Foreign land acquisitions are an example of how some

* Meat consumption per capita refers to the total meat retained for use in country per person per year. Total meat includes meat from animals slaughtered in countries, irrespective of their origin, and comprises horsemeat, poultry, and meat from all other domestic or wild animals such as camels, rabbits, reindeer and game animals.

[7] Adapted from Source(s): Food and Agriculture Organization of the United Nations (FAO), FAOSTAT on-line statistical service (FAO, Rome, 2004) & Food and Agriculture Organization of the United Nations (FAO) 2010, Livestock and Fish Primary Equivalent, 02 June 2010.

countries are coping with a growing population by taking advantage of the hierarchical disparities of global nodes.

With a population that has increased by 120 percent in 10 years[8] and now reaching seven million, places like Riyadh, the capital of Saudi Arabia, have grown to become important linked nodes in the global network. While desalinization plants, high tech irrigation systems and smart urban planning have been satisfactory solutions at meeting the food needs of a growing population thus far, Saudi Arabia has decided to follow the global phenomena of outsourcing agricultural production by investing in large tracts of arable land abroad in order to strengthen domestic food security.

The cash-rich country has invested over 100 million euros for food production in Ethiopia (Economist, 2009) and their interest in African natural resources is only increasing with their fervent demand. Showing the increasing interdependence of the world economy and the effects it has on our ecosystems, the inextricable dynamics of foreign land deals is a clear manifestation of metropolitan socio-ecological systems in the 21st century. Current land purchase and lease arrangements for example, are strongly driven to meet home state food and energy needs and so foreign land investors are increasing their dependency of food commodities for their long-term stability (Mann, 2010). "The combination of more people and less land makes food a safe investment, with annual returns of 20-30 percent, rare in the current economic climate" (Knaup 2009). In addition to the social and economic implications faced by threatened communities from foreign land deals, environmental degradation can also ensue. The sheer size of projects can greatly affect soil quality, biodiversity and water supply, thereby leading to "ecologically destructive and unsustainable" systems of agricultural production (Graham 2010). With the rise of global food volatility and an expanding world population, it is likely that the demand for large-scale foreign land agreements will also continue to rise. This results in a growing interdependency between host countries hungry for capital accumulation and foreign actors focusing on feeding their own people. Foreign land deals may appear as viable solutions to foreign investors, but it does not provide a sustainable solution to the growing needs that affect the entire world. Limited access to arable land and increasing food insecurity drives countries like Saudi Arabia, which have the technology, capital and infrastructure to exploit resources elsewhere for their own gain. Countries like Mexico must cope with urbanization challenges in a different way and many would agree that sustainable solutions could be the drivers for positive change.

3.2.5 Adapting to change

The incorporation of sustainable development practices has become a favorable approach in tackling the aforementioned issues pertaining to resource management and socioeconomic inequality. One of the most commonly used definitions of sustainable development is from the landmark Brundtland Commission report of 1987 that states; "Sustainable development is development that meets the needs of the present without

[8] Kingdom of Saudi Arabia Arriyadh Development Authority (2009). *Investment Climate in Arriyadh City Annual Report.* Arriyadh City*:* Kingdom of Saudi Arabia Arriyadh Development Authority.

compromising the ability of future generations to meet their own needs". All definitions of sustainable development see the world as a system in time and space, where 'everything' is connected and wired. Events in one region can influence other regions now or later on. Foreign land acquisitions for example, are not sustainable. When it comes to agricultural production, exploiting resources without considering the long-term effects it has on people and the planet is no longer viable. Finding ways to meet these challenges requires our generation to come up with solutions that involve the simultaneous pursuit of economic prosperity, social equity and environmental preservation[9].

Furthermore, current forms of production and distribution do not take into account waste management, logistical inefficiencies and unequal power dynamics. Alternative methods of production and resource extraction minimize damage to human and ecological systems and bring the concept of sustainable development to light. As one of the preeminent leaders of agri-cluster developments that apply sustainable solutions and resource efficient designs, the Netherlands has attracted the interest of emerging economies that see the collaborative potential of applying the knowledge entrusted to follow suit. As in the case of Mexico, a developing country that is experiencing significant growth in regards to urban density, it looks towards more industrialized nations for solutions or models that may be replicated in their states. While some schemes are not adequate representations of progressive agricultural practices or perhaps unbefitting to apply to unique country situations, there is still an immense learning opportunity that can reveal strategies for growth and pitfalls to avoid when reaching for sustainable agriculture to meet today's cosmopolitan demands.

3.3.1 System design of a Metropolitan Food Cluster

To meet the challenges brought on by urbanization, it is important to come up with new systems that transcend outdated methods of production. Wageningen University in the Netherlands has been a knowledge institution involved in several sustainable MFC projects across the globe and is thus a valuable partner to help Mexican leaders in agri-businesses set up an appropriate platform. Metropolitan Food Clusters is an Intelligent Agrologistic Network (IAN) that is comprised of Agroparks, Rural Transformation Centers (RTCs) and Consolidation Centers (CCs)(van Mansfeld et al., 2012).

This spatial clustering concentrates several value chains in an industrial set up and serves various agro and food linked services and functions (Nogales, 2010) for local and global delivery. As nodal points in the space of places, the network system of MFCs contains several hubs. Rural Transformation Centers (RTC's) work as collection centers for local products and encourage rural development by linking agroparks to the local community. They also act as knowledge hubs in their local environment for the associated farmers as service centers (health care, training, credit facilities, ect.) (Smeets, 2011, p.243) while Consolidation Centers (CCs) redistribute products from the producers and processors into small compound flows that will be sent to supermarket

[9] Hasna Vancock Hasna, A. M. (2007). "Dimensions of Sustainability". *Journal of Engineering for Sustainable Development: Energy, Environment, and Health* 2 (1): 47–57.

and food buyers in the city close by. A graphic representation of the spatial configuration of such an Agrologistic Network System (IAN) is seen in Figure 6.

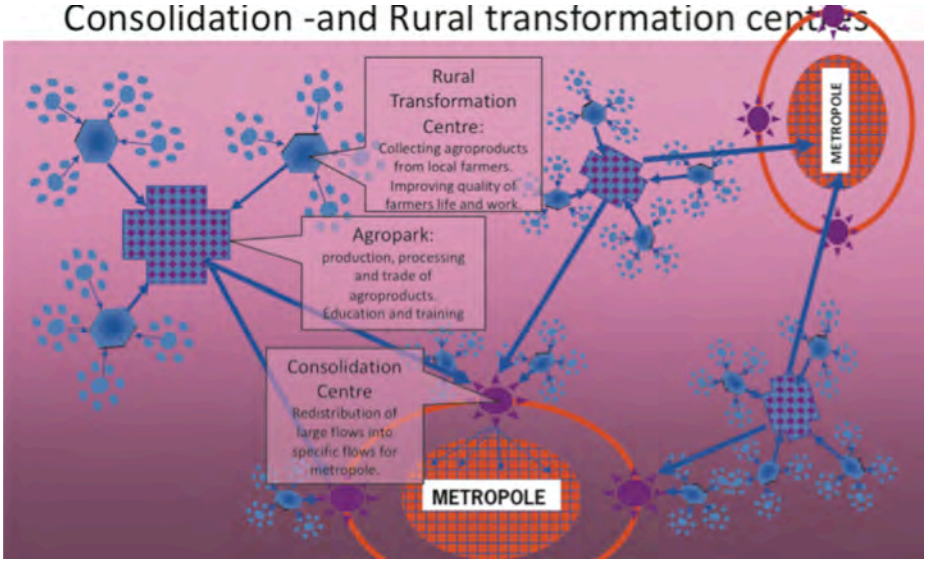


Figure 6 Spatial agglomeration of an IAN (van Mansfeld et al., 2012)

This thesis pays special attention to the creation of agroparks, the third functionality of an intelligent agrologistic network system.

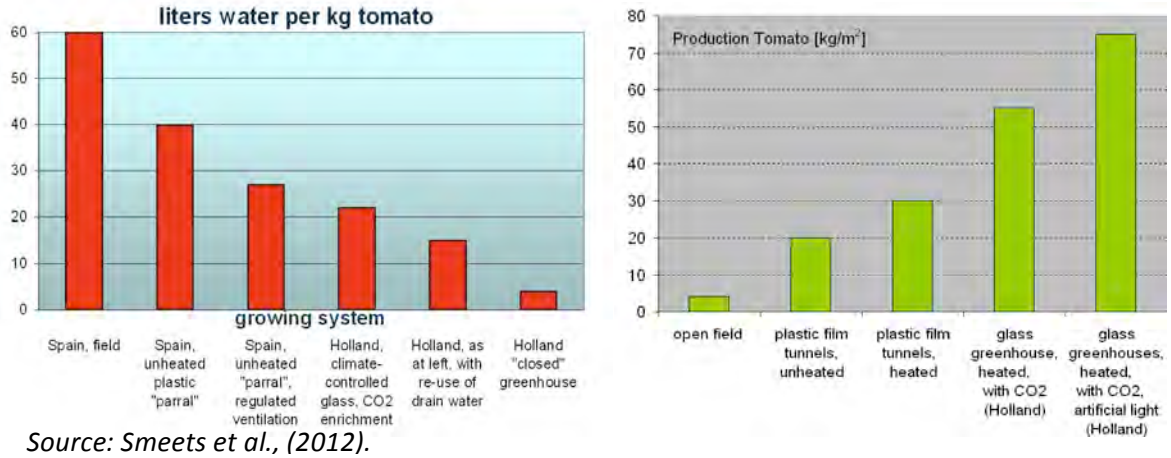
"Agroparks bring together high productive plant and animal production and processing in industrial mode combined with the input of high levels of knowledge and technology. The cycles of water, minerals and gasses are skillfully closed and the use of fossil energy is minimized, particularly by the processing of various flows of waste products and by-products. An Agropark may therefore be seen as the application of industrial ecology in the agro sector. Agroparks are the outcome of a design process in which a new balance is sought between agriculture as it functions in global networks and the local environment of those same farms. It amounts to a system innovation, i.e. not just the innovation of agricultural production itself but also of other relationships among the stakeholders concerned. In this regard, the concept of sustainable development occupies centre-stage as a set of objectives that are simultaneously concerned with a reduction in environmental pollution, greater economic return and a better working and living environment for the people concerned" (Smeets, 2009, p. 21-22).

This entire network utilizes physical space that enables horizontal and vertical integration to take shape for large-scale management of waste, water, energy and logistics. The principle behind this complex system design is resource use efficiency[10], which claims that maximizing efficiency of resources yields high productivity outcomes.

[10] Behind the concept of resource use efficiency is Liebig's Law of the minimum which states that the productivity of the whole system is not determined by the total amount of resources available, but by limiting factors (scarce resource). The growth and yield of a crop, for instance, is determined by the availability of limiting factors, which vary. For instance, if there is not enough nitrogen (limiting resource) then productivity will be minimal even if all other factors are satisfactory (Smeets 2011).

To illustrate this principle, figure 7 below has been provided to show low vs. high resource use efficient systems. The chart on the left demonstrates how many liters of water are needed to produce a kilogram of tomatoes. The chart on the right displays how many kilograms of tomatoes per square meter are produced using different

Figure 7 Comparison of Tomato production and water use in different growing systems



Source: Smeets et al., (2012).

methods of production. The comparison shows that an open field uses a much higher proportion of water to grow tomatoes than a closed greenhouse would. At the same time, the kilograms of tomatoes per square meter grown in glass greenhouses is 14 times greater than a traditional open field system. Recognizing that the increase of factors (water, land, nutrients) allows growth to continue until that limited resource is depleted (Hiddink and Kaiser, 2005) is an important concept in the design of a sustainable Agropark. For a closer examination of the benefits that an MFC can bring, it is important to link the relative problems with solutions. Empirical findings suggest that the innovative application of IAN in MFCs enable the manifestation of agricultural activities that are suitable in a metropolitan setting which advance sector production and manufacturing practices (Smeets 2011). They also adopt the suggested strategies of a 2011 United Nations report that emphasizes the need of food produced as close as possible to consumers to cut down on preservation, packaging, transport and handling.

Perceived Problems	Proposed Solutions
Food miles	Agrologistic network design: Cluster agribusiness activities in agroparks for urban food needs
Decreasing agricultural area vs. growing urban pop	High intensive food production in agro-parks
Critics from Society	Agro-parks providing sustainable, nutritious & animal friendly products
Unsustainable waste flows	Closed waste cycles in agroparks, resource use efficiency
Producer-consumer gap	Horizontal and vertical integration, provide (school) visits to agroparks, food labels
Landscape destruction	Limit to intensive agroparks in order to protect the rest of the landscape,
Social inequalities	Agroparks that support accessibility and integration strategies for the well being of urban poor and rural world 3 inhabitants.
Environmental pollution	Resource use efficiency, technical innovation for cleaner production methods
Animal well-being	Clusters minimize animal transport & foreign pathogens which prevents illness outbreaks

Table 2: Schematic overview of food issues perceived by advocates of MFCs. Adapted from (Broekhof, et al., 2010)

As mentioned before, food related issues in the urban system escalate land usage and dietary concerns while keeping the inequalities of rich and poor intact. Table 2 gives an overview of these and other perceived issues and possible solutions that an agropark in an MFC can provide.

3.3.2 Developing KENGi networks in a MFC

While RTCs, processing facilities, land acquisition, and other technical applications are indeed very important for the creation of such a complicated logistical network, the focus of this investigation lies in the more abstract and altruistic pillar of network formation. Although the physical characteristics of an agropark can be realized through capital investment, technical know-how and other more tangible applications, I propose that one of the most important aspects of the design process; and the one needed for the momentum of the project of this size and magnitude is social capital, a concept that emphasizes the value of a social network and the impact it has on the productivity of individuals and groups[11].

Theorists point out that this relationship among different institutions "captures multiple reciprocal relationships at different points in the process of knowledge capitalization"(Etzkowitz, 2002). The vision and network design of a MFC is based on a transdisciplinary approach of acquiring knowledge by encouraging the exchange of ideas and finding commons goals among different institutional stakeholders, or KENGi. The principle behind the creation of KENGi alliances is influenced by the triple helix model of Dutch sociologist Loet Leydesdorff, which describes the dynamic connection and links of varying degrees between government, universities and enterprises that form social structures contributing to collective output while at the same time, advance their personal gains and objectives (Belussi, 2010). The first dimension of the triple helix

[11] Putnam, R. (2000). *Bowling Alone: The Collapse and Revival of American Community.* New York: Simon and Schuster.

model is deciphering the transformative role each entity plays in the formation of knowledge capitalization, such as policy regulations or trade restrictions imposed by the state. The second is the convergence and influence one has over the other. For example, national governance policies over intellectual property rights for research institutions. The third dimension is "the creation of a new overlay of trilateral networks and organizations from the interactions among the three helices, formed for the purpose of coming up with new ideas and formats for high-tech development" (Etzkowitz, 2011). Although rather simplified, the model demonstrates that value networks can move outside and across organizational boundaries with the common purpose of stimulating knowledge-based economic development (Etzkowitz, 2011). Moreover, it can potentially lead to the creation of an open innovation process that leads to further regional economic and social development (Leydesdorff, 2005). Rather than displaying a linear relationship among participants, it shows the spatial connectivity of entities and resources in a more fluid fashion. The fluidity of movement suggested by the interpretation of network configurations blurs the "spatial patterns, social modalities and structures of governance; where relationality refers to the ways in which domains of collective existence influence and even constitute each other" (Axford, 2006). While this may open new insights to relational links, it also destabilizes spatial constructs and complicates network studies. Each node has its own distinct set of resources, infrastructure, capital investment needs and labor market, the institutional spheres all have established linkages that overlap and interconnect with one another (Etzkowitz, 2011).

While some view this model as a goal to strive for in order to implement a new system of innovation, others see it as a depiction of the downfall of innovation, with government owned corporations sponsoring laboratories on university campuses (Etzkowitz, 2011). This thesis however, presents it as a model aimed at developing lateral ties, which relies heavily on the social dynamics of its actors for knowledge sharing and innovation creation, hence, social capital is the starting point for developing system innovations that rely on state-industry-university relations. Nevertheless, synergy among institutional actors can be difficult to assemble due to conflicting objectives, cultural traditions and the hierarchical structure of the institutions. In Latin America for example, strong boundaries between separate institutional spheres and organizations exist based on old ideologies, which creates a gap between innovation creation and its applicable use (Etzkowitz, 2011). To elaborate, universities have traditionally existed apart from predominant, state-owned industries in countries like Mexico. While academic institutions have resources available for R&D and operate as isolated entities, they are traditionally not market driven nor have a real-world context for use. This has resulted in innovation that has not been implemented for general use or implemented for production methods. As Dr. Smeets would put it "a system innovation is a shared value creation" so by placing value on social capital, cooperation and interactive dialogue to take place, it contributes to the movement of ideas, people and spaces (Belusi, 2010).

This chapter has given the reader many examples of how urbanization in the network society has changed the food system. MFCs may be an effective method of bringing food to urban centers in a sustainable fashion. Building their social networks for their successful implementation is what this investigation is ultimately about. The following chapter will discuss the methods of this process by detailing how I have gathered data on stakeholders, where the empirical analysis took place and what sort of activities where assumed to achieve the procedure for implementation.

4. Research Approach

4.1 Establishing the trajectory

Now that the reader has been given a general overview of what a MFC is comprised of and briefed on the theoretical concepts that help address the research questions, this chapter will outline the methods that were used to investigate institutional networking in Agrosfera. Uncovering collective influence, or lack thereof, can reveal what factors limit or contribute to strong networks and the ultimate success of a MFC. Since the nature of MFCs in the developing world is relatively new, ongoing, debatable and specific literature regarding network formation in clusters is limited (Nogales, 2010), a grounded theory strategy was adopted and data has been analyzed in a thematic, multi-method approach through observations, interviews and literature analysis.

The first section of the chapter discusses how I reached my conceptual argument with preliminary research. Then, special attention will be given to the internship organization and why adapting my interests to their needs was pivotal in centering the focus of the investigation on stakeholders as a unit of analysis. Thereafter, some geographical and socio-economic characteristics of Aguascalientes are mentioned to give the reader a picture of the setting were the data collection took place. I will close the chapter with a description of how the raw data was analyzed.

4.2.1 Arriving at my hypothesis: literature review

Long before my particular interest in MFCs and network formation took shape, my curiosities gravitated towards issues pertaining to geographies of food consumption and production. My background in economics and community development shaped my understanding of the socio-economic implications of modern food systems and their complexity fueled my desire to gain further insight into the current food shift in urban environments. While most of the literature I encountered in my preliminary search dealt with global commodity chain linkages, food security issues or enhancing farmers' access to markets, there was little information on sustainable food schemes that address urban needs at a large scale. Seminars like *The Future of Food: an exploration of the global food system* enabled a deeper exploration of current agri-business practices that have been strengthened by market information systems and improved efficiencies within the supply chain. Even though such efficiencies and export-led growth strategies have provided new sources of revenue to many processors and manufactures in the food industry, many other parts of the chain (i.e. producers) "have little or no opportunity for creating, or capturing, greater value" to generate deeper commercial and developmental spin-off (Nogales, 2010, p.4). I wanted to get a better understanding of the forces behind such a divide and what relation they have to external influences such as globalization and urban growth. Identifying the causes of inequality led to investigations relating to the social and spatial arrangements of food systems and so this is around then time when Manuel Castells' Network Society theory became relevant in studying the emergence of food production methods in a shifting spatial construct. While Castells theory speculates electronic communication and information systems as

the catalyst of flow shifts for the emergence of a new kind of space, other studies (Coe et al., 2001, Leydesdorff 2005, Etzkowitz et al., 2008) suggested that spatial proximity is still relevant and rather important. This perplexing contradiction pushed my curiosities even further so I began to study cities and how their food systems function in Castells' Network society.

With urban spaces as central nodes of interconnectivity that are growing in scale, the facilitation processes of macro-structural changes has led to the restructuration of global food chain tactics. The concentration of new knowledge, labor and capital has powerfully contributed to the "millieux of innovations" that advance the formation of international networks (Francke and Ham, 2006). This was particularly interesting to me because it validates the idea that face-to-face interactions, geographical closeness and cultural norms still have value in a society that now places so much importance on computer-mediated communication. So while my original queries dealt with the imbalance of power in the food chains, they shifted to areas focusing on network expansion through building organizational capacity in the agro-food industries. Concepts like cluster zones became more relevant in the formulation of leading perceptions depicting structural interconnectedness so the literature review expanded to include studies on clusters. Strong cases to support value networks in agricultural clusters encompassing vertical, horizontal and support linkages were further established with literature review (Thompson et.al, 2001, Johansson 2003), which mention that their formation can act as local responses to globalization. Their strategic management and knowledge specialization can remain locally embedded to enhance regional growth while at the same time, build competitive advantage in the global marketplace.

In the case of the ornamental horticulture industry for example, the production of cut flowers can be transferred over to countries where the climate is more ideal and energy costs are lower. Belussi et. al (2010) argue that if firms, universities and the public sector work together to invest in research and product/process innovation, it keeps 'in house' activity costs down as in the Netherlands, which has a district (Boskoop) specializing in ornamental agriculture. Keeping the most profitable activities (in science application: plant propagation, seed production, logistics, marketing and retailing) in-house has given them a competitive edge, thus placing them as a global leader in the cut-flower industry. Other cluster researchers have pointed out that in Latin America, the agricultural sector(s) are simply users, not generators of technology, and have low innovative capacity since clusters (in those regions) tend to be primarily managed by foreign hands, with core-decision making in the capital city or abroad (Nogales, 2010, p.15). While the Netherlands has advanced commercial structures for such applications, developing countries like Mexico face other challenges that may obstruct alliance formation and market expansion. So finding the obstacles that may hinder network development for such clusters in emerging economies became a central objective in my exploration.

The FAO's 2010 report on agro-based clusters in developing countries was influential in my decision to concentrate research efforts on the roles actors play in forging synergies. The report highlights the importance of institutional networking as one of the most relevant drivers of competitiveness and for the diffusion of knowledge.

"Cluster approaches recognize that all actors in the agricultural value chain are often more innovative and successful when they interact with supporting institutions and other actors in the supply chain" (Nogales, 2010 p.14). Empirical cases in the report also show that working together contributed to institutional change and upgrading among successful wine, fruit, flower and salmon clusters in Latin America and that it was "conscious collective action by local stakeholders to solve common problems" that encouraged change (Nogales, 2010). In recent years, the Colombian cut-flower industry began to apply similar innovation techniques as their Dutch competitors by recognizing the power of collective action. They created the Colombian Center for Innovation in Floriculture to promote growers and exporter associations, support research endeavors, technological development and enhance competitiveness through certification schemes and innovative practices in soil and water use efficiency (Nogales 2010, p. 34).

Even though I began to understand why cooperative alliances among participating institutional actors nurture cluster growth, I was still unclear about the inputs that build connectivity among participants. In other words, I had formulated the research problem and wanted to know why some institutional partnerships in clusters work and others don't. The research questions at this stage of analysis were: How do you build upon existing alliances to create collective action? If there is a path to co-innovation, how is it maintained and is it open to all those that want to be involved? While my initial hypothesis started with vague ideas concerning the food industry and the increasing interconnectedness of our society, questions became descriptive in nature and focused on extracting information on institutional actors in agricultural clusters. Although I knew wanted to gather data on organizational capacity and management practices within agricultural clusters, I still needed to have a proposal that was flexible enough to meet the needs of the internship organization I was going to work with. At this point, I began to invest time searching for an external organization involved with agri-clusters in developing countries. My aim was to present investigation initiatives relating to network formation within clusters in the framework of an academic internship.

In late spring of 2012, I happened to come across Dr. Peter Smeets' work on Metropolitan Food Clusters while browsing the Wageningen University website. His experience researching and planning projects aimed at improving agricultural practices, integrated regional development and urban-rural relationships directly correlated with my interests and research objectives. I took the chance of contacting him with a thesis proposal examining value chain linkage for food markets in the developing world through an emphasis on the organizational aspect (i.e social processes) of food cluster design. The timing of this inquiry couldn't have been more appropriate since a research team had recently embarked on a feasibility study in a Mexican MFC project and were seeking to concentrate their efforts on capacity development. Their particular interests included engaging more KENGi in the design process and to identify key stakeholders that would make future content-based and economic contributions.

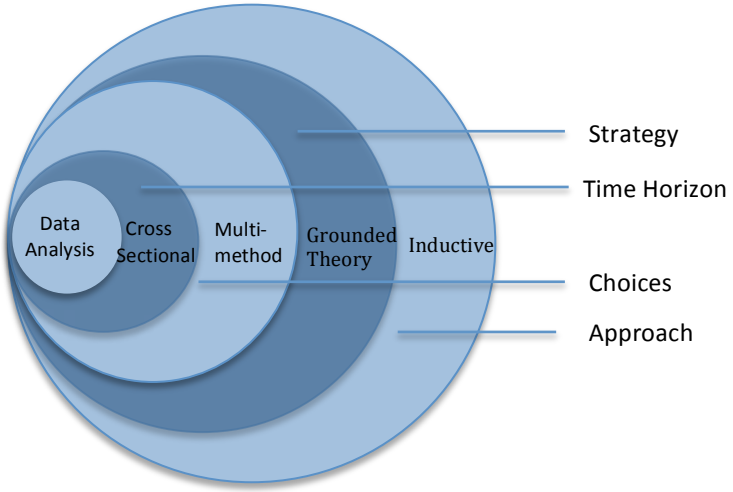


Figure 8 The research 'onion' adapted from Saunders

Since Agrosfera is in a state of flux and continuously evolving, the process of the research itself needed to be flexible enough to follow the state of progress and so an inductive method was assumed at this stage. According to scholar David Thomas, a general inductive approach allows "research findings to emerge from frequent, dominant or significant themes inherent in raw data, without the restraints imposed by structured methodologies. Key themes are often obscured, reframed of left invisible because of the preconceptions in the data collection and data analysis procedures imposed by deductive data analysis" (Thomas, 2003, p.238). Common in social science research, this type of research strategy is suited to gain insight into the different processes of stakeholder participation and characterized by being selective, exploring depth more than breath and focusing on a small sample size of research units. (Wubben, 2011, p. 148). Although an inductive approach is somewhat protracted, it is appropriate since the data as well as the literature emerges much more gradually compared to other methods, therefore a cross-sectional time horizon was suitable to adopt (Saunders, 2009). An illustrative representation of the layers of the research design that have been considered is seen in figure 8.

I familiarized myself with the concept of Agrosfera by reviewing pre-feasibility reports, information on the participating companies, meeting minutes and other relevant literature pertaining to the project in Aguascalientes, which was obtained from the project leaders at Wageningen University. Through this data search, I was able to identify who had been involved since the project inception and what sort of role they played to ensure its momentum. This was a critical point in my research since I was able to identify many stakeholders, which influenced the interview selection process later on. At this point in my research, I had set forth my tentative proposition, which related to institutional stakeholders and their relative importance in MFC formation and my central research question was aimed at identifying the factors contributing to and limiting network expansion in a prospective MFC. So after meeting with Dr. Madeleine van Mansfeld, the project leader of the Agrosfera project, I was invited to participate in the Aguascalientes (AGS) mission for which we departed for on May 27, 2012. While I had primarily focused the initial literature review on agri-industry development in emerging economies, the visit to AGS gave me the opportunity to witness and analyze

first hand KENGI network formation of an emerging MFC. In order to make the most of my time in AGS, I needed to get acquainted with the state and its special characteristics that make it so attractive for a high-risk development project like Agrosfera.

4.2.2 Research location: Aguascalientes, Mexico

Figure 9: Relative distance (km) to large urban centers from AGS

Located in a semi-arid region in central Mexico, the state of Aguascalientes (AGS) covers only .3% of the countries' surface area and is home to 1.1 percent of the national population (Cuentamé, 2010). The terrain is partly mountainous, with the highest region located in the west at 3,000 meters above sea level while the lowest has an elevation of 1,600 meters above seal level (Encyclopedia of Mexican States, 2007). Even though Aguascalientes is a land speckled with hot springs, it only has a few wells and little rainfall (550 mm rainfall or average; last two years only 250 mm) (van Mansfeld, 2012, p.40). With rivers that run dry for several months out of the year and water basin content in high demand, increasing water productivity is a primary concern. Annually, 534 million m3 of water is extracted from deep wells of 300 million m3 is effectively recovered for aquifier recharge, leaving an annual deficit of 234 million m3 (van Mansfeld 2012, p.41). 35% of the land in AGS is used for agriculture that is either rain-fed or irrigated. While corn, beans, chilies and alfalfa (used for fodder) are popular crops, the state is known nationally for its guava and dairy production.

Due to its strategic position in the middle of the country, terrain logistics are strong for national distribution of products like those mentioned above. AGS has great

potential in developing itself as a prime export hub to source food products to nearby cities like Mexico City (20 million inhabitants) Monterrey in the north (4 million inhabitants) and Guadalajara in the southwest that has a population of 5 million.
Although it is the fourth smallest state in the country, AGS has a big presence economically. The per capita income of AGS citizens is around-85,000 (over 5,000 euros)- which is relatively high and more evenly balanced among its population (as compared to other states in Mexico) (van Mansfeld, 2012). With well-maintained haciendas, natural baths and home of the famous San Marcos Fair, Aguascalientes attracts an array of visitors year round. According to the International Finance Corporation of the World Bank Group, AGS ranks number two among 32 cities/regions in Mexico for ease of doing business in 2012[12]. In the past decade, many international

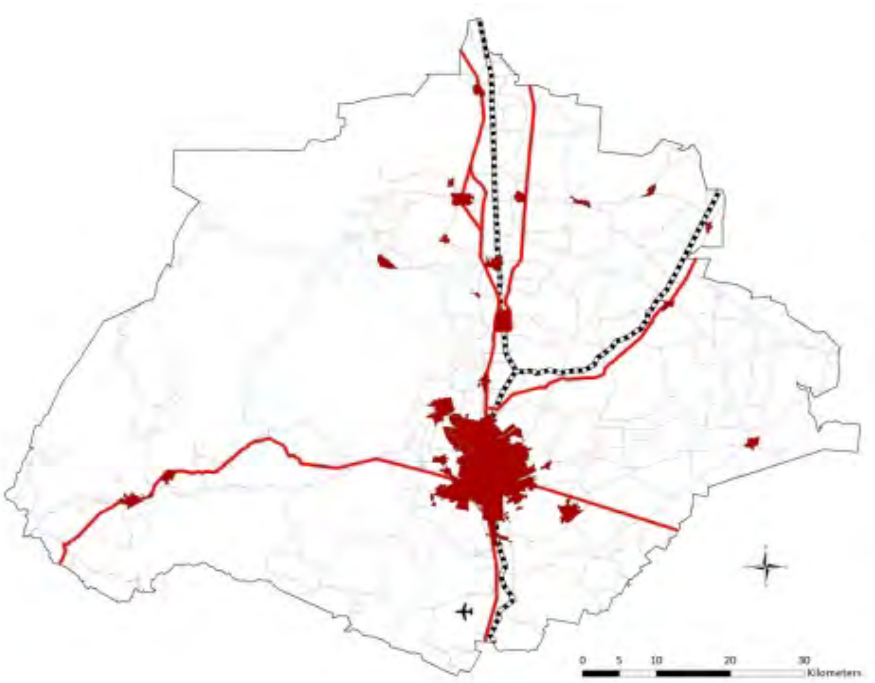


Figure 10: State of Aguascalientes; central highways & population clusters (van Mansfeld et al., 2012)

companies such as Nissan, Xerox and Texas Instrument have taken an interest in the regions strong economy, prime location and ample labour force by establishing manufacturing plants. In 2012, Nissan decided to grow capacity in a new 2.0 billion dollar manufacturing complex in AGS that will create 3,000 direct and up to 9,000 indirect employment opportunities (Nissan, 2012). With above average GDP per capita,

[12] Key indicators relating to ease of doing business include: dealing with construction permits, registering property and enforcing contracts. (IFC, 2012)

an ideal geographical position and a strong presence of large industries, it is no wonder this dynamic state is experiencing tremendous changes. According to the latest data from the Mexican national census, Aguascalientes is the 16th largest metropolitan area by population in 2010 so nearly 80 percent of its population is concentrated in the urban center. To meet the needs of large foreign companies and a growing population, AGS has expanded energy grids, water management networks and interstate highways (Guerrero, 2002). Aguascalientes also sees the prospective of diversifying their market share with a highly developed agri-food chain system and creating more linkages worldwide to function more efficiently in the network society.

Liberalization of trade and the withdrawal of public assistance in agriculture have resulted in "price and quality standards being set by international markets" (Pimbert et al. 2001, p.6). Aguascalientes is a state with a strong and important agricultural sector that would like to increase its competitiveness in trade and enhance its logistical capacity for cost reductions (Mansfield, 2012). It is for this reason that government leaders in Mexico first contacted Wageningen in early 2010. In joint collaboration with the federal, local, state government, private sector, financial institutions of rural financing and with assistance from the agricultural counsel of the Dutch embassy, the capitalization and investment fund for the rural sector (FOCIR is the Spanish acronym) contracted Alterra, part of Wageningen University to develop stages of a conceptual master plan for a successful Metropolitan Food Cluster (Delgado, 2012) in Aguascalientes.

To promote the interests of Mexican producers, FOCIR is a governmental institution that promotes investment in the rural and agribusiness sector (Delgado, 2012). Their primary objectives include the increase of long term financing, offer financial and technical assistance to agribusinesses and promote management of capacity building which are to be accomplished through direct investment in Mexican businesses (Delgado, 2012). Dutch project managers have helped initiate the process, develop the master plan and act as key facilitators. Rather than importing innovation mechanisms that may have worked in the Netherlands, it is important to analyze the local situation. This is done in order to determine the available resources that can be used to start the incubation process for knowledge based development and identify what is missing and how it can they be found (Viale, 2010, p.9).

4.3.1 Organizational capacity in a MFC and stakeholders as a unit of analysis

After learning from past MFC projects in China, India, Korea and the Netherlands, the Dutch team came to the realization that one of the most influential markers affecting project success for an MFC concerns social capital and the relations among actors in a social network. Due to its importance, the organizational capacity needed to be examined in Aguascalientes (AGS) and that is why my research proposal ultimately led me to accompany the Alterra group to Mexico. Since the basic aims of a MFC are geared toward improving the livelihoods of urban dwellers and limiting the destruction of natural resources, then understanding the individuals and groups that affect or are affected by this system is crucial for its outcome (Mayers, 2005). Agrosfera is an appropriate MFC to analyze organizational capacity of KENGi for two main reasons. First,

Aguascalientes is a highly dynamic, urbanized area that is experiencing immense demographic, environmental and social stresses but also has great potential in contributing to community-based development and meeting food demands of large metropolitan regions, locally and transnationally. It is an ideal setting to research the social processes of an emerging MFC that its ultimate objective is to bring about innovative and sustainable change in a region with great potential. The second reason for studying the social phenomenon of an MFC is due to its development phase. It is at a stage where strong relationships are just beginning to form and roles are still being assigned. In this phase, an observer can analyze the evolution of a community of practice (CoP) through the formation of social capital among the institutional actors involved. Furthermore, analyzing the behavior of participants shows how relationship structures break down, strengthen and so on to help explain why certain patterns emerge (O'Brien, 2010). Therefore, identifying key stakeholders to ascertain the importance of trust and relationship building in such a complex system innovation can garner the answers I am searching for. Since stakeholders play such a pivotal role in the formation of a MFC, they were selected as a unit of analysis. "Stakeholder analysis is an approach, a tool, or set of tools, for generating knowledge about actors", with the aim to understand their conflicting interests, intentions, and behavior, to access the influence and resources they bring to bear on the decision-making and/or on the implementation of activities (Wubben, 2011, p.147).

4.3.2 Who are the stakeholders?

Several approaches were utilized to identify and select the most appropriate stakeholders for this research. The first approach was mentioned in the literature review section. Going over past meeting notes and contracts provided useful information about the agencies and officials who consistently attended meetings, made an effort to share their ideas with the group, partook in financial transactions and signed contracts. Besides going though written records and data, Alterra project leaders also identified relevant stakeholders. Dr. van Mansfeld and Dr. Smeets worked closely with some individuals in Aguascalientes and had a good sense of who among them had a strong role and/or interest in a MFC. Third, I was able to identify and establish rapport with people who make a significant impact on the design, objective and ultimate success of the project. Observing the social phenomena created by the consequent actions of those concerned also engaged me personally in the process. I was able meet and greet the stakeholders of the emerging system design, participate in meetings, get a tour of facilities, build contacts and take notes during discussions. The fourth approach was asking the stakeholders directly. After explaining what the research was about, many

revealed their own views and mentioned names of people of whom they thought would provide keen insights. This approach also led to a better understanding of their social relations as well as the perceptions they have toward one another. Given considerations of cost and time, I selected a small sample size of 12 stakeholders representing the critical subgroups of government, university and enterprises. Although the original aim was to interview three or four stakeholders from each (KENG) institution, the presence of non-governmental organizations was severely lacking, even after applying all of the approaches aforementioned. While non-governmental institutions like community-based organizations certainly shape and influence MFCs, their absence may indicate that at this particular phase of the development process, their contribution as KENGi stakeholders is not substantial. This issue impacted my research results and will be discussed at further length in chapter 5.

Once the unit of analysis was decided upon and research objectives were clear, gathering raw, qualitative data to read and interpret was the next step to derive findings (Thomas 2003). Since the research question deals with the factors contributing and/or limiting network expansion, key informants were encouraged to put forward information in their own way, thus a semi-structured interview method was selected (Mayers, 2005, p.9) while an informal checklist of issues/questions was used to guide the dialogue. There is a mixture of probing, specific and closed questions (Saunders 2009) that pose define variables into measurable factors. This approach gathered subjective and objective points of view that expose strong predictors of change, trust and risk (Saunders 2009). The interview consists of approximately ten open-ended questions that are dependent on the answers given and what type of institutional stakeholder was being interviewed (e.g. academic, business or government).

While site selection and personal time with the participants was limited, the matter of convenience, privacy and comfort was considered thus, interviews were held at various locales such as during flights, after business meetings, on the road to a field site visit and over skype. Once they had given me their consent, the majority of participants (75%) chose to have the taped interview conducted in Spanish and face to face. Translation and transcription occurred after the interview while categorization and main point extraction was completed after all interviews had been inputted successfully. Each unit of data was assigned a unique code. Searching for patterns on the coded data then enabled me to categorize the answers, which were then recoded to express more meaningful values (Dey, 1993). Each category was given a color that acted as a visual aid to help organize the data process and efficiently retract specific categories for deeper interpretation.

4.4 Collecting data: assessment strategy

Once an appropriate time and place was selected, the participant was given a seat and the research objective was described to them so they could feel at ease during the interview process. To be brief and influence their answers as little as possible, I explained that my goal was to study the social processes of stakeholders involved in the development of an agropark. This final section will elaborate upon the procedures used to collect data, why the questions posed in the interviews were selected and how they

are linked to my research sub questions and goals. Thus, data was gathered and analyzed to:

1. Identify stakeholders and their role in Agrosfera

As mentioned in chapter three, deciphering how institutional actors contribute to the exchange of ideas is one of the most essential elements of triple helix, or in MFC terms- KENGi formation. The involvement of stakeholders in the realization process of a system innovation is characterized by specific roles and responsibilities they may possess. Each stakeholder carries out traditional roles based on their institutional capacity (e.g legal representatives approve contracts) but the roles shift and evolve in a MFC since a primary factor for innovation creation is knowledge integration and bringing forth institutional change (Wubben, 2010). Discovering the unique ways stakeholders can contribute to project success can help establish accountability, respect, fairness and more transparent communication channels which leads to the creation of social capital (O'Brien, 2010). Additionally, this question was asked to determine the current input and participation of stakeholders (i.e their role) to help uncover gaps and overlaps that may weaken project objectives due to competition or duplication of effort. The roles of stakeholders designing and implementing complex and sustainable agricultural production systems have varying degrees of importance.

Participants were asked to state their name, title, what KENGi institution they represent and how they are involved in Agrosfera. Behind each given role is an abbreviation in parenthesis that distinguishes whether it is important (i), very important (vi) or somewhat important (si). The abbreviation will be followed after a number to indicate how many times it has been mentioned. The various stakeholder roles include: initiator (vi), planner (i), organizer (i), executer/operator (vi), monitor/evaluator (vi), (legal) approver (vi), partner (i), investor (i), and coordinator (si) (Wubben, 2010, p.147). This technique used for the categorization of stakeholder roles is based on the work of food system dynamics experts Emiel F.M. Wubben and Gohar Isakhayan. In the results chapter, the data appears in a chart that contains all of the names of interviewed stakeholders, their KENGi affiliation and role in the development of Agrosfera as seen in the example below:

Name	KENGi	Role	Importance	Type
F. Carvallo (F.C)	G	Monitor, Planner, Organizer Coordinator	1vi, 2i, 1vi	Influential

Table 3: Example of KENGi role and importance

Based on their position and involvement, the chart will also show which group they are classified under- influential, key or potential.

a. **Influential stakeholders** have an indirect impact on the realization of project objectives and their stake is influenced by the project implementation.

b. **Key stakeholders** significantly affect and are affected by the achievement of the organizational objective and are involved in the realization process.

c. **Potential stakeholders** are prospective players that could become key or influential at a later phase of the project.

This assessment may also reveal their contribution to the structural formation of an agropark since they all have different levels of involvement and influence over the project. However, determining the impact individual stakeholders play in the formation of a social network is complex and difficult to measure due to the transitional nature of their power and interest. Hence, their unique position, role and interaction they have with others is captured only in this specific time frame.

2. What an Agropark means to them

Another question that was asked to determine what factors contribute to and/or limit network expansion among stakeholders in a MFC pertains to their level of understanding of the Agrosfera concept. In order for strong partnerships to form and a system innovation to flourish, it is not only important to identify specific needs and interests, but also for each stakeholder to be fully aware of what encompasses the system design of an agropark. Organizing a social network is contingent upon clear goals and definitions (Leydesdorff, 2005). Misguided presumptions of what the project entails may discourage further involvement and damage its reputation, leading to a halt in social capital formation (Calridge, 2004). Furthermore, if their understanding of what an agropark is misconstrued, problems might arise due to expectations that may fall short of their intended outcomes. Similarly, the question sheds light on how well stakeholders understand the project itself and what communication channels can be implemented based on the answers of the most proactive participants. This enables them to make better-informed decisions and apply their knowledge in the most appropriate channels to meet common objectives (Kilpatrick & Falk 2010). As mentioned in chapter two, the three elements required for a Community of Practice include the domain, community and practice. If the domain- the definition of the area of shared inquiry and of key issues- is not well established, it poses limitations on CoP development (Wenger 2002). When stakeholders are misinformed or confused about what the project entails, miscommunication may arise and trust compromised which can hamper network expansion and Communities of Practice. To learn more about their understanding of an agropark, the question asked is worded the following way:

"Please give me a brief definition of what an agropark is."

The most common phrases and words mentioned were highlighted during analysis and a compilation of their descriptions was contrived. Again, this was done to measure their level of understanding of the system design and to identify any misconceptions. Once common objectives are articulated and knowledge gaps are identified, sharing and co-learning can ensue to help form a Community of Practice (CoP).

3. Evaluate their influence/importance in the project

Once stakeholder roles and identity were evaluated, a critical examination of their power and relationships they have with other participants in the emerging Agrosfera network was conducted. In accordance with the goals set forth for this research, the analysis of power dynamics was achieved by determining the influence each participant

has over the development of the Agrosfera project and how important they are to its overall success. Anne Marie Groots' (n.d) report on stakeholder matrices has been a helpful guide for accessing the relative importance each stakeholder has. The report remarks that knowing the power stakeholders have serves the following purposes:

a. Ascertains relative risks posed by these stakeholders and potential coalitions.
b. Identifies the importance of a particular stakeholder group and whether or not the voices of certain actors are heard. If a particular institution has more power and influence over the project design, it causes imbalances in power structures and affects the linkages of the network.
c. Compares and contrast information about the participants for a project like Agrosfera.

A matrix containing symbols that represent a qualitative assessment of relative influence and importance of each stakeholder has been created.

Influence refers to the power stakeholders have over the Agrosfera project to control what decisions are made, facilitate its implementation or exert influence that affects the project positively or negatively. Influence is in fact, the extent to which the stakeholder is able to persuade or coerce others into decision-making and/or implementation of actions (Groot, (n.d), p.5). Although many variables may affect a stakeholder's relative influence, 5 criteria have been selected for this research. They include:

- Hierarchy (command and control, budget holders, number of staff/employees)
- Authority of leadership (charisma, political, connections)
- Control of resources for the project (hardware or other inputs, contract negotiations)
- Possession of knowledge (specifically pertaining to Agrosfera)
- Negotiation position (strength in relation to other stakeholders in the project

Importance refers to the priority given to stakeholders in order to meet the needs and interests of a project innovation. Importance is distinct from influence. Some stakeholders (e.g. the participation of a logistics company upon which Agrosfera places great significance) might be considered important but have very limited power to influence key decisions. The following set of questions that have been used to assess the "importance" of stakeholders include:

- Is their involvement in Agrosfera significant? (i.e needs and expectations congruent with project objectives?)
- Do stakeholders' interests converge with the objectives and mission of the project?
- Do they have power of vote in key decisions?

Evaluation of stakeholder importance is based on a five-point scale:
1= very low
2=low
3= moderate
4= high
5= very high

Questions of influence were given via a 3-point scale (no, potentially and yes). Thus, each stakeholder was given an indicative ranking and given a pair of numerical coordinates as can be seen by this example:

Stakeholder: T. Olivares					
Influence Score	**1**	**2**	**3**	**4**	**5**
Hierarchy					✓
Leadership					✓
Control				✓	
Knowledge				✓	
Negotiation			✓		
Importance Score		**no**	**Potentially**	**yes**	
Involvement				✓	
Common interests				✓	
Power of vote				✓	
Total = **33**	**Influence (y): 21 Importance (x): 12**				

Table 4: Influence importance scale example

If stakeholders had similar scores, further evaluation was given based on notes, observations and interview question responses. For example, T. Olivares is a businessman and the president of the Agricultural State Council of Aguascalientes (CEAA-el Consejo Estatal Agropecuario de Aguascalientes) that is comprised of large enterprises and SME's in the state. Mr. Olivares has been involved in the Agrosfera project since its inception. He has a great deal of charisma, strong public and private sector connections, is included in negotiations, and has mentionable influence over key decisions. Based on these and other characteristics, Mr. Olivares was given a score of 21 points for influence and 12 points for importance, totaling 33 points. Once all of the stakeholders were surveyed, their coordinates were placed in a matrix divided by four quadrants that act as a plot along a continuous axis from low to high. The matrix is further divided into four quadrants and provides the following insights of stakeholders depending on their placed location (IFAD, 2009):

Quadrant I. Stakeholders of high influence and high importance should be closely involved throughout the preparation and implementation of the project to ensure their support.

Quadrant II. Stakeholders of high influence but low importance are not the target of the project but could possibly oppose the project what is being proposed. Keeping them

informed and acknowledging their views on the project in order to avoid disruption or hindrance of the project's preparation and implementation should be considered.

Quadrant III. Stakeholders of low influence and low importance are unlikely to be closely involved in the project and require no special participation strategies (beyond information-sharing to the general public).

Quadrant IV. Stakeholders of low influence and high importance require special efforts to ensure that their needs are met and that their participation is meaningful.

This visual representation of the influence and importance stakeholders have in the current phase of the project may help to identify some factors that limit or contribute to the formation of a strong social network in Agrosfera. For example, stakeholders with influence can divert project resources and help build partnerships, whereas those who lack it can act as beneficiaries of the projected outcome of alliances. Typically, stakeholders of high importance but little influence may need special project activities or measures to ensure decision-making control.

4. Pinpoint risks and Identify obstacles

Interviewed participants were asked to list any risks associated with project participation and if there are any obstacles that may limit network expansion. While attitudes towards risk change over time and can vary according to circumstances and information available, identifying them can avoid problems down the road that could adversely affect the project. These questions are set out to identify the primary limitations for the development of social capital. As mentioned in chapter two, social capital operates on the basis of mutual trust and collective interest. When there is an insufficient amount of trust, stakeholders see the risk and obstacles as hurdles too high to cross and are less likely to commit. As the level of mutual understanding and trust increases, strategic partners become more comfortable with the uncertainties of the alliance and become more committed to form value networks (O'Brien, 2001, p.8). There is an important differentiation between the risks and perceived threats an institutional actor faces when they participate in the Agrosfera project with the obstacles that prevent further progress from happening. Even though the two questions are interrelated, one explores the explicit concerns of the actors involved while the other surveys the consequential forces of these risks that halt action.

After extracting the most relevant points and coding them according to the answers mentioned, the most common risks impacting the project are listed accordingly and explanations are mentioned for clarification.

5. Evaluate and rank the most important issues via a scale matrix

This interview question aims to address the research goals expressed in chapter one of identifying what builds alliances among stakeholders that lead to sustained growth. Detecting the issues a participant may value provides insights into their ambitions and primary objectives for their involvement in a system innovation like Agrosfera.

Furthermore, a comparative analysis of issues may help discover common aims, which can spur knowledge exchange and enthusiasm for project success. Once top priorities are identified, they can reach out to those with similar concerns and thus, purposeful action can ensue to tackle them more effectively. Respondents were asked to rate an issue that is relevant to the development of Agrosfera on a scale of one (least important) to ten (most important). The issues are based on the strategy determination of the overarching principles of MFCs (Smeets 2011) and the SWOT analysis generated for hardware design and group rural transformation, which is highlighted in the 2012 feasibility report (van Mansfeld 2012) for Aguascalientes. The issues are:

Trust	Rural development
Technology	Capital investment
Water shortage	Power relations
Innovation	Sustainability
Employment	Training/education

There were some issues from the list that did not produce a response and therefore labeled a N/A on the chart in the results chapter. This was due to some interviewees choosing not to give a score and/or technical errors (e.g. poor quality recording). All of the issues are significant and relate to one another so they were not asked to score them in comparison to the others. Instead, the issues were given a score based on their relative importance to the participant and significance to the mission objective of Agrosfera. The mean of each (sample) category/issue was taken in order to get the average set of value. If they did not respond, I took this into account and did not include them in the calculation of the mean score. So if there were 12 interviews but only 9 respondents, the score given from the responding individuals was used. Some interviewees strongly emphasized certain issues and explained that they were of upmost importance. These issues were coded with a plus sign (+). I also took the mode of tens to determine which issue received the 'most important' score. During the interview, respondents were also asked if there were any other key issues they would like to add that were not mentioned and these answers were uniquely categorized and discussed in the results chapter.

6. Uncover the various ways each respondent participates and how they can encourage others to get involved

A principle goal of this study is to identify how key stakeholders share ideas and foster network growth. This interview question was meant to give the participants a platform by which they could share their thoughts on network formation. Allowing stakeholders to think creatively on how to establish new alliances or improve existing ones can generate original ideas and refine propositions. The question was customized according to the KENGi stakeholder. Below are a few examples of how this open-ended question was formulated:

How is the University contributing to the formation of connections?
What do you think needs to happen to create future collaborations?
How can Vali collaborate with other enterprises involved in Agrosfera?
What needs to be done in order to integrate other KENGi actors in the project?

Similar to the other questions, answers were thoroughly analyzed to develop categories and detect common themes. Major trends and patterns were identified with unique responses categorized separately.

7. Identifying strengths, weaknesses, opportunities and threats

The final analytical tool is a SWOT (strengths, weaknesses, opportunities and threats) analysis that has been carried out on themes relating to organizational capacity such as consortium building, protocols, market business development, communication and risk management. When carrying out a SWOT, the categories were based on differentiation between the social organization of Castells interconnected world of networks at a macro scale and micro scale. In the case of Agrosfera, the micro world that needs to be taken into account when analyzing network formation to which strengths and weaknesses refer to is defined with:

- Participating entrepreneurs
- Local and federal government
- Knowledge institutes

Relevant elements diffused at a macro-scale are:

- Markets
- Social processes outside AC
- Parts of Aguascalientes society that explicitly take no part of Agrosfera:
- Other industries
- Other social bodies

Categories of Strengths, Weaknesses, Opportunities and Threats were prioritized while 5 of the most important of each have been selected to determine high scores in strengths and weaknesses per opportunity and threat to identify the most important elements of strategy[13]: this was done by dividing 100 points for each opportunity and threat over the strengths and weaknesses. Adding up the total score of each strength and weakness gives an indication of the importance as a whole to impute that specific strength or weakness (van Mansfeld et al., 2012, p.61).

The high scores determine the strategy for seizing the opportunities or countering the threats. An additional analysis on the basis of the resulting spreadsheet with the scores determines:

[13] Defensive strategies may signify a strong threat that requires defensive action whereas offensive strategies generate action by making the most out opportunities (*Strategic Management: SWOT Analysis,* 2010).

- for each important strategy element if and if yes on which opportunity or threat this element is specifically aiming
- the focus of the general strategy by comparing the scores per quadrant
- a relative high score in the quadrant Strength x Opportunity indicates an offensive strategy
- a relative high score in the quadrant Strength x Threat indicates an defensive strategy
- a relative high score in the quadrant Weakness x Opportunity indicates a strategy aiming at “changing the mess”
- a relative high score in the quadrant Weakness x Threat indicates a strategy aiming at “surviving”

In summary, this chapter describes the methods and procedures used to examine stakeholders and their participation in an emerging agri-food cluster. The first section elaborates on the formulation of a thesis objective and how the methodology was based on observation, field site visits and in-depth, semi-structured interviews with KENGi actors. Agrosfera in Aguascalientes was chosen as a case study of MFC development due to its potential of serving the food needs of a growing population and the phase in which I was introduced to the project. The chapter also discusses how I arrived at selecting the participants and how the questions posed relate to my primary research objectives. The following chapter will link the data for grounding connections between the empirically based analysis and present the results of the qualitative research.

5. Findings

5.1 The Journey: Linking relationships with results

As a rising star in a competitive world market, Mexico has the potential to implement sustainable solutions in agriculture but the journey is not easy. Analyzing the social processes involved in a project like Agrosfera may strengthen capacity building initiatives that contribute to a successful system innovation implementation in Aguascalientes, Mexico and beyond. This chapter will present an overview of the results from data collected in Aguascalientes, Mexico. The first section of the chapter will introduce the reader to the role and influence participants have in the implementation of Agrosfera. Identifying their position and interest in the project helps establish a basic understanding of who they are, what Agrosfera means to them and how they can influence the social processes that lead to knowledge exchange and successful project initiatives. The second section analyzes the risks and obstacles that may impede network expansion as well as subjective input from the stakeholders themselves in regards to building new alliances and forming stronger partnerships. Then a SWOT analysis, which filters information gathered into a manageable quantity of key issues, is presented (Strategic Management, 2010).

5.2 Roles and identity in the Agrosfera project

Stakeholders were analyzed according to their contribution, which KENG institution they represent and what their purpose is for participating. Every one of the twelve interviewees questioned is an expert in their field and represent a knowledge, enterprise, or governmental institution, so they can be viewed as subsystemic actors within a system. The table below lists the interviewed stakeholder and presents their name, KENGi group classification and what role they play in the creation of Agrosfera. Finally, stakeholders are classified into three types: potential stakeholders, influential stakeholders; and key stakeholders (Wubben, 2010, p.147).

Table 5: Profile and role(s) of respondents

Name	KENGi	Role	Importance	Type
J. Delgado (J.D)	G	Initiator, Executer, Approver, Organizer, Investor, Partner Planner	3vi, 4i	Key
J. Narvarez (J.N)	G	Initiator, Executer, Approver, Planner, Organizer, Partner, Coordinator	3vi, 3i, 1si	Key
E. Velazquez (E.V)	G	Monitor, Organizer, Coordinator,	1vi, 1i, 1si	Potential
F. Carvallo (F.C)	G	Monitor, Planner, Organizer Coordinator	1vi, 2i, 1vi	Influential
T. Olivares (T.O)	E	Initiator, Executer, Monitor, Planner, Organizer, Investor, Partner, Coordinator	3vi, 4i, 1si	Key
J. Medrano (J.M)	E	Executer, Investor	1vi, 1i	Influential
C. Rojas (C.R)	E	Investor	1i	Potential
H. Benavides(H.B)	E	Organizer, Investor	2i	Potential
M.Koopmans(M.K	K	Initiator, Executer, Investor, Partner	2vi, 2i	Influential
L. Alba (L.A)	K	Initiator, Monitor, Planner, Organizer, Coordinator, Partner	2vi, 3i, 1si	Key
F. Garnica (F.G)	K	Executer, Planner, Partner, Coordinator	1vi, 2i, 1si	Influential
P. Smeets (P.S)	K	Initiator, Executer, Monitor, Planner, Organizer, Coordinator	2vi, 2i, 1si	Key

As can be seen from the table above:

- All twelve respondents make unique contributions but the most common roles distributed among all of the interviewed stakeholders are that of the initiator, organizer and executer
- Government representatives are the strongest actors (initiators, executers, approvers) in the complex design process
- There are very few monitors/evaluators and approvers among the interviewed participants
- Of all the KENGi interviewed, enterprises have the greatest potential of taking on more roles and responsibilities

5.3 Mission: Defining Agrosfera

The following definition is a compilation of their descriptions:

An agropark is a physical space where actors in the agro industries work together to induce value creation for their products.

- 100% of the respondents described Agrosfera as a system where cooperation among different actors takes place. Phrases used include: "Combining techniques", "collaborating", "work together", "knowledge sharing", and "grouping of common interests".
- 50% of the respondents mentioned how an agropark generates more efficient systems within production chains.
- 40% of the respondents used the term **integration** to explain how products/facilities and/or actors function in an agropark.
- Only 20% of respondents mentioned resource use efficiency in their definitions.

There was a consensus among participants that an Agropark may maximize efficiency and generate greater production value for the businesses involved. Even university representatives highlighted aspects of commercialization as the primary scope of an agropark.

"It is a place where some entrepreneurs in the agricultural field settle in a specific place and work together…to develop successful businesses. – L. A

"It is a physical space with necessary infrastructure that allows the development of commercialization and where (businesses) can interact with one another and generate sustainable economies while at the same time, promote growth" –F.G

5.4 Stakeholder influence/importance for project development

Now that the interviewed respondents have been identified, their institutional representation has been differentiated and their understanding of an Agropark has been examined, a closer look at the power dynamics that impact project development will be displayed via a stakeholder influence/importance matrix. This analysis of power dynamics was achieved by determining the influence each participant has over the development of the Agrosfera project and how important they are to its overall success.

As mentioned in the research methods chapter, KENGi stakeholders were given points based on their influence level as well as their level of importance. The points of each stakeholder amounted to a total sum and plotted along the axis. The horizontal axis (x axis) represents the relative importance of a stakeholder while the vertical axis (y axis) represent the relative influence of a stakeholder. The influence and importance these interviewed participants in Aguascalientes have over the project is captured in the matrix seen in figure 11.

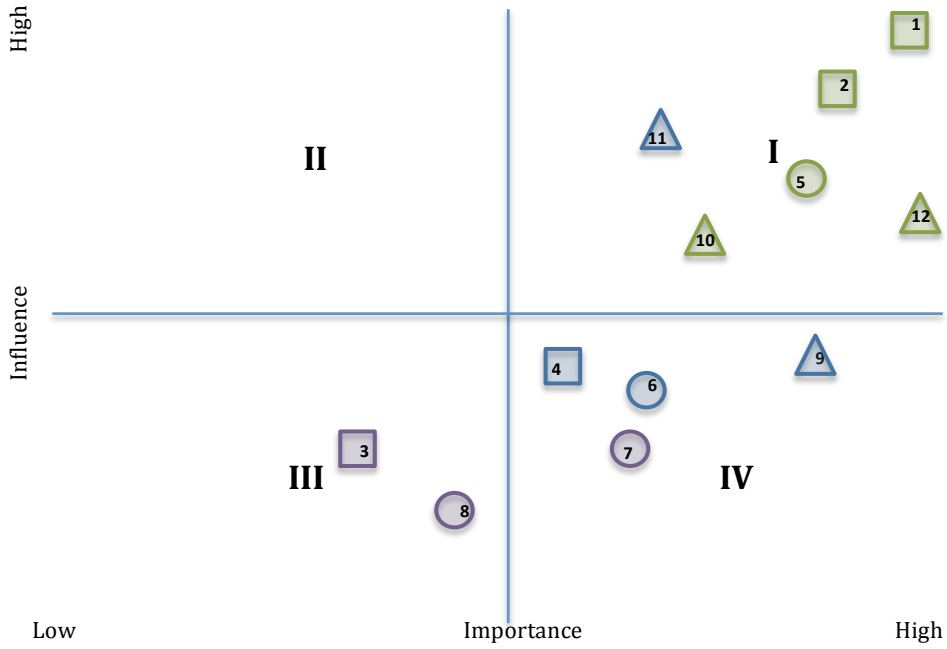


Figure: 11 Stakeholder influence/importance matrix

1. J. Delgado (FOCIR)
2. J. Narvarez (SEDRAE)
3. E. Velazquez (EG)
4. F. Carvallo (FOCIR)
5. T. Olivares (CEAA)
6. J. Medrano (Frio Express)
7. C. Rojas (Vali)
8. H. Benavides (Agro Depot)
9. M. Koopmans (University of Queretaro)
10. L. Alba (Instituto Tecnologico de Pabellon de Arteaga)
11. F. Garnica (Universidad Tecnologica del Norte de Aguascalientes)
12. P. Smeets (Wageningen University/Alterra)

The matrix displays the present landscape of the Agrosfera project in Aguascalientes. The stakeholders in quadrant one play a covenant role in the decision-making process and share common responsibilities within their own agencies. All of the key stakeholders are in the first quadrant, thereby reinforcing the claim that individuals who hold the most power and that make decisions are vital for project development. The two most influential and important key stakeholders are from the government sector and exceed other participants regarding the power they hold. Many of the stakeholders (50%) have the potential of being more influential and carry more responsibilities to achieve greater importance.

While knowledge institutions and the government are represented in the first quadrant, only one key enterprise has the influence and importance to be placed in this section. The only quadrant that is not occupied is the one representing stakeholders that hold high influence but low importance which refers to actors that may show resistance to project formation. This may reflect a possible underrepresentation of participants from which the data was gathered from, or perhaps a sign that that there is limited opposition to the project. As Dr. Smeets puts it:

"There are a lot of small farmers there, and for them, this process could also be a threat. As it is now, one of the things that we have to elaborate (upon) is how can we develop Agrosfera in such a way that it could at least (involve) a few of these farmers, a perspective in their future… in the development of their own life, because we need them to come along. Agrosfera will generate a lot of employment and there is a lot for people that could be suited to work in Agrosfera. The solution is there, but it requires a lot of political talk and also finding ways to bring these people in and starting to get them involved in the process, to have this be their process".

5.5 Identifying the risks associated with participation

"All business ventures entail risk, and especially being involved in agricultural activities (a high-risk industry), we are accustomed to. No one is telling us that this will be an immediate success. Any successful project requires time to mature and as such, Agrosfera will need time to develop and we have many factors to our favor". –M.O

According to the respondents, the most common risks that may impede Agrosfera project development are: Time, lack of synergy and/or involvement from other stakeholders, fear of innovation, tarnished institutional reputation and conflict of interests.

Perceived risks associated with participating in Agrosfera → -Time (no results, political support)
-Conflict of interest
-Fear of innovation
-Lack of synergy
-Tarnished reputation

1. Time

Ten of the twelve respondents mentioned time as one of the most common determinants that hinders project success. This deduction can be further divided into two realms. The first is associated with producing results in a specific time frame. Several of the respondents mentioned that without concrete results within an adequate amount of time, actors will lose interest and the project will seize to exist.

"Even if (entrepreneurs) have subsidies from the government, if they do not see the results, they will want out". -J.D

M.K, the scientist involved in a resource use efficiency project currently underway, says that:

"Time is the biggest risk. I need to make progress fast enough. This (wastewater treatment) technique needs to show results, otherwise people will lose interest and credibility can be lost".

The second realm is closely associated, if not interlinked with the former and it concerns the length of time a politician serves in office. Five of the twelve respondents mentioned political support, or rather, the length a political party that supports this endeavor serves in office as a factor affecting the continuation of Agrosfera.

"We have elections coming up and change might occur so whatever you do, it has to happen this year or you have to set a very firm base to continue". –F. C

"Sometimes you see projects die…especially in a political year. You know that all of (the people representing a particular party) with federal positions will leave and I don't know if the guy from FOCIR is going to be there or not and so we don't know if the project is going to happen or not. You should know that. This is key" – J. M

2.Resistance to change and or/innovation

Another answer that uncovers the risk stakeholder's have with participating in Agrosfera concerns the nature of the project itself. Agrosfera addresses issues of food security, rapid urban growth and resource management in a global context. Its application requires technological capacity, sustainable practices and a willingness of stakeholders to think outside of the box. The incremental process of innovation begins with creative input and the desire to improve and so, another risk that was stated several times from different respondents concerns the involvement of potential stakeholders and their resistance to change and/or innovation.

"(Agrosfera) has to result in a dynamic platform that can be duplicated in other parts of the country. It is a project that is at a top-notch level, nationwide and globally. We are taking a risk by (thinking and acting differently). By being innovative, especially in Latin America. It is a risky long-term project". -J.N

H.B, who represents a medium-sized enterprise and whose job involves communicating

with a lot of other SME's in the area said the following insightful comment:

"The problem is that too many people are too closed. They do not accept advice. They have a certain way of doing things and this is a custom of generations. 'If my grandfather did it this way, and my father did it this way, then I will too…why do I need to change'? The biggest risk is that people do not see that they need to advance, improve, be better…be innovators! They need to change their mentality".

While time and fear of change may pose some setbacks for the success of the project, stakeholders also conveyed enthusiasm and see their involvement as an opportunity. Knowledge institutions in particular expressed this sentiment.

"There is no risk. On the contrary, this will help us advance our progress as a knowledge institution. By collaborating (with Agrosfera), it helps the university expand its curriculum, attract new students as well as specialize and secure a line of investigation. We don't see risk, but rather an opportunity". -L. A

F. G, the dean of university in AGS reiterates this opinion in his own words:

"This type of project changes traditional business practices in Aguascalientes and this is an opportunity…we want to help businesses be more successful. By establishing a new major (sustainable agriculture) and expanding class options, we strengthen our infrastructure and the quality of our education".

5.6 Obstacles in their path

Time, building alliances, political restraints and lack of organizational capacity were the most common obstacles mentioned by ten of the respondents. Only two respondents replied that there were no obstacles and answered in a manner that dismisses any negative connotations for the project.

"There are no obstacles. First, we have the support from a country like the Netherlands, and we also have the support of our state and federal authorities. Also, there is genuine interest from the growers and producers so I don't think there are any obstacles". -T.O

While T.O sees the support from government authorities as a driver for project success, others see their influential role as a possible detriment.

"This is a sad thing to say, but it is the truth… governmental projects, like Agrosfera, tend to be supported and pushed by current administrations. Here in AGS this is the second year of the current governor and it will take at least one more year to see something really building up, something tangible, some hardware…what is today the priority in terms of agriculture for the current administration but may not be a high priority for the next, as it is now...several entrepreneurs (have said) 'I like it, I think it is a good idea, it's worthwhile to go to meetings and share my thoughts and if I can contribute that's fine...but is (Agrosfera) gonna last'? I regret to say this, but sadly, that has been the history in the past. Projects that are started by the current administration but are not followed up by the next one". -E.V

While a few other respondents have similar sentiments like E.V, there were others who see the absence of enterprise involvement as the major roadblock instead, due to the lack of commitment from the businesses located near Agrosfera. In short, the majority of interviewees feel that many potential participants, (such as local business owners) are not committing to the project due to the lack of concrete initiatives currently underway. F.C's response touches upon every mentioned obstacle:

*"You might say this could be **just another investment that might not work out**, but the stakes are very high and (the key stakeholders) know the seriousness behind this project. The governor was very skeptical of the project and said that (Agrosfera) takes more time than a boy reaching manhood because a year had passed and nothing happened. What was really the turning point was **the idea to bring in the big enterprises together and form what is called the executive committee** in the sense that they will be the prime movers. So if they do that, there will not be any problems for the others follow, **if they don't buy the idea and they don't commit themselves, then there is no way it can work out**...what could be the obstacles you might find...first if you see these companies weaken, falling apart, the second is **political contamination**, meaning that some political issues might come up. On the other hand, (citizens of) AGS are expecting this to happen, thinking about it, reading about it. By the way this is another problem**...if there isn't some sort of goal attained very soon, it might happen that people might lose interest in the project**…and the whole project might fade out. This is very, very dangerous. **Something physical has to get done**…That way the people will see what (Agrosfera) really means, but (we) have to be careful and act fast".*

5.7 Building Alliances

In order for this project to manifest, you need critical mass –C.R

Stakeholders involved in Agrosfera mentioned the following actions that can build alliances, which may contribute to project success:

- Share resources/facilities
- Focus on engaging local community/include rural agents
- Diminish institutional fragmentation by nurturing triple helix alliances
- Be drivers of change- Take risks, trust more
- Technological applications

5.8 Issues of importance

To identify concerns that should take precedence in Agrosfera, respondents were asked to give a critical issue a score of 1 (least important) to ten (most important). The results are highlighted in a preliminary scoring sheet seen in table 6 while the calculated average scores are listed in table 7.

KENGi actors	JD (G)	FC (G)	JN (G)	EV (G)	MK (K)	LA (K)	JM (E)	HB (E)	CR (E)	TO (E)	PS (K)	FG (K)
Technology	10	10	8	9	5	10	9	10	10	9	5	10
Trust	10	10+	10	10	10	10	10	10	9	10	10	10
Water shortage	10+	10	10	10	8	10	NA	NA	10	NA	8	10
Innovation	9	10	10	9	6	9	9	10	9	9	7	10
Employment	8	10	6	9	6	10	NA	8	10	9	8	10
Rural development	8	9	9	8	7	10	9	10	10+	10	7	10
Capital investment	10	NA	NA	8	8	9	8	NA	8	8	7	10
Power relations	9	8	9	8	8	9.5	10	10	10+	10	6	10
Sustainability	8	9.5	10	8	8	10	10	NA	10	9	9	10
Training/Edu	NA	NA	NA	10	7	10	10+	10	10+	8	7	10

Table 6: Issues of importance to stakeholders: Rank and average rating

Table 7 shows that trust, the water shortage and sustainability are the top three issues that stakeholders are most concerned with.

Issue	Ave score	+	Allotted 10's	N/A
Trust	9.52	+	11	0
Water	9.55	+	7	3
Sustainability	9.23	0	5	1
Training/Education	9.11	++	6	3
Power relations	8.96	+	5	0
Technology	8.75	0	6	0
Employment	8.55	0	4	1
Rural development	8.52	+	5	0
Innovation	8.52	0	4	0
Capital investment	8.44	0	2	3

Table 7: Average score of important issues

For clarification purposes, some of the respondents interpret the notion of sustainability as an environmental concern, others have a broader definition.

"Most important thing is to set this project in motion without the help of certain external actors. So sustainability is crucial in order to make a long lasting/permanent change. At the current, stage the most important thing is creating connections to push this process along." -F.C

Like F.C says, while it is important to have external actors that can facilitate the process of Agrosfera, it is imperative to have institutions in Aguascalientes be self-sustaining and to focus on strengthening the skills and competencies of the potential stakeholders in their own communities. Being accountable for their actions and taking responsibility of the project is an empowering approach to catapult proactive change. Others like J.N agree with this sentiment:

"We have to make sustainability a priority, establish a theme of coordination and capacity building. Not just talk about them, but to really implement them. We need to come up with common/central objectives and to nurture those things...innovation, trust and communication".

Other key issues that were not asked about but that are important to stakeholders include: the desire to build their nation's image and to achieve a high level of competitiveness by creating stronger alliances.

"What we see in the Netherlands is that they are really good at working together, cooperating while staying competitive. Mexico is not like that. Instead of helping one another to sell, generate profits, we see each other as competition. It is a cultural thing. And we can change it by educating the people. To show them that we can take more risks and there are other ways to do business". -C.R

J.M, the owner of a refrigerated truck company specializing in cross-border produce hauls expressed the following sentiment:

"We don't want to be third world companies anymore. We want to be world-class businesses that compete in the world market. (This is the sentiment of all the businesses) that participate in this project. This is our goal".

This section of the results chapter has discussed the factors that contribute to an enabling and disabling environment for network expansion in Agrosfera. The final evaluation of the data involves a SWOT analysis that summarizes internal and external factors that are advantageous or disadvantageous to achieve the goals set forth for social capital development in the empirical case of Agrosfera.

5.9 SWOT Analysis

		STRENGTHS					WEAKNESSES				
		"Big 7" (influential/important entreprenurial actors	Ambition of government	Good education level	Cooperative will among participants	triple helix represenation strong	lack of continuity in government	resistance to change/innovation	lack of ecological conscience	Heavily dependent on family relations	red tape/administrative complications
OPPORTUNITIES	vicinities of markets/other actors	12			15	10	15	18		22	8
	growth of purchasing power	10	8		8		15	20	18	6	15
	congruency of objectives and goals	8	12		12	12	18	12		14	12
	development of stakeholder roles	18	9	8	12	20	15			18	
	Agro business companies ('big 7') looking for change	8	8		12	18	10	12	8	12	12
THREATS	Political restraints	12	15		12	15	20			8	18
	non inclusion social sector			12	8	12	8	15	18	12	15
	passing of time diminishing trust	10	10		18	18	18	6			20
	bureaucratic incompetencies		15	12	10	15	18			10	20
	passive attitude	12	12		8	10	12	12	10	15	9
		90	89	32	115	130	149	95	54	117	129

Figure 12 SWOT analysis

Results of organizational capacity formation

The following strengths, Weaknesses, Opportunities and Threats were prioritized:

Strengths
-Influential/important entrepreneurs
-Ambition of the government
-Good education level
-Cooperative will among participants
-Triple helix representation strong

Weaknesses
-Lack of continuity in government
-Resistance to change/innovation
-Environmental concern lacking
-Heavily dependent on family relations
-Red tape/administrative complications

Opportunities
- Vicinities of markets/other actors
- Growth of purchasing power
-Congruency of objectives and goals
-Development of stakeholder roles
-Agro business companies (big 7) looking for change

Threats
-Political restraints
-Non-inclusion of the social sector
-Passive attitude
-Passing of time diminishing trust
-Bureaucratic incompetency

All scores added per quadrant show the following result:
220 Offensive strategy (Strength x Opportunity)
280 Defensive strategy: (Strength x Threat)
236 Cleaning the mess: (Weakness x Opportunity)
264 Surviving: (Weakness x Threat)
Pre-dominant strengths and the specific opportunities (o) and threats (t) they are aiming at:

Cooperative will among participants (115) aiming at (o) or countering (t):

(o) Vicinities of markets and other actors (offensive strategy)

(t) Passing of time diminishing trust (defensive strategy)

Triple helix representation strong (130) aiming at (o) or countering (t):

(o) Development of stakeholder roles (offensive strategy)

(o) Agro business companies (big 7) looking for a change (offensive strategy)

(t) Passing of time diminishing trust (defensive strategy)

Pre dominant weaknesses and the specific opportunities (o) and threats (t) they are aiming at:
Lack of continuity in government (149) hindering to take (o) or worsened by (t):

(o) Congruency of objectives and goals (cleaning the mess)

(t) Political restraints (surviving)

(t) Passing of time diminishing trust (surviving)

(t) Bureaucratic incompetency (surviving)

Heavily dependent on family relations (117) hindering to take (o) or worsened by (t):

(o) Vicinities of markets/other actors (cleaning the mess)

(o) Development of stakeholder roles (cleaning the mess)

(t) Passive attitude (surviving)

Red tape/administrative complications (129) hindering to take (o) or worsened by (t):

(o) Growth of purchasing power (cleaning the mess)

(t) Political restraints (surviving)

(t) Passing of time diminishing trust (surviving)

(t) Bureaucratic incompetency (surviving)

The SWOT analysis indicates that a defensive strategy predominates while survival strategies closely follow. Even though strengths like triple helix representation supports developing stakeholder roles and encourages agri-business change, the lack of government continuity and administrative/red tape worsens bureaucratic incompetency and trust over time.

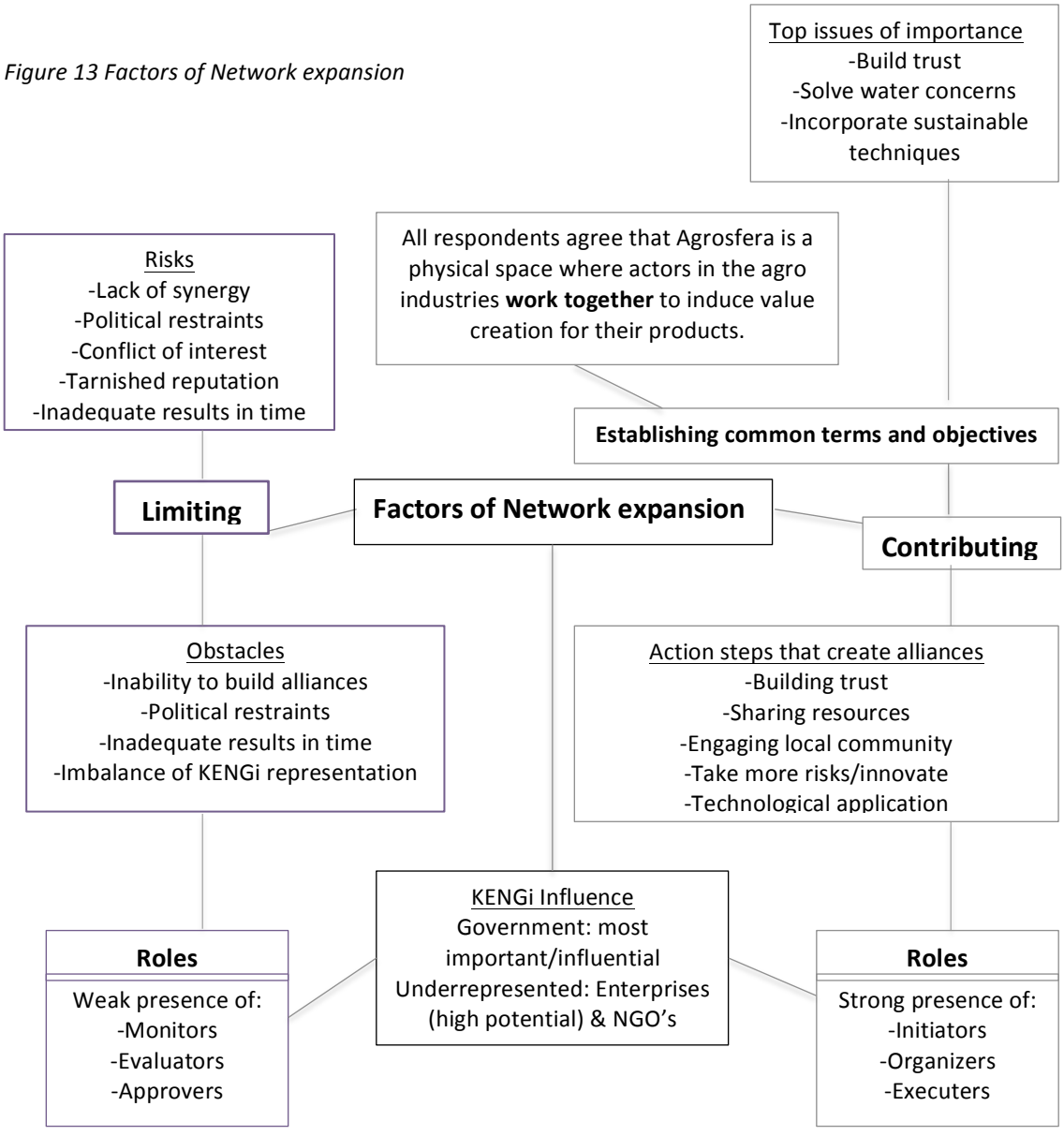
Strategies out of the SWOT include:

1. Stimulate joint access for markets
2. Formation of transparent communication channels
3. Highlight success stories, foster optimism to keep momentum
4. Stay aware of common goal objectives to hinder any bureaucratic setbacks/red tape
5. Communication flow facilitated, organizing dialogue process
6. Trust building between actors; identify problems, foster solutions; active intervention
7. Take advantage of geographical vicinity to increase cooperation and participation

The SWOT analysis and interview results are meant to accomplish the goals set forth in chapter two, extend knowledge in the field of social network formation for MFCs and contribute to the overarching theoretical concepts associated with social capital and building communities of practice. While the sections above could be seen as tedious list

of unrelated data, its format was intentional in order to present the results of the research through an unbiased, unfiltered lens. Figure 13 is a chart that gives the reader an overview of the discoveries and therefore answers the research question by showing the factors that limit and contribute to network expansion in the empirical case analysis of Agrosfera. The following section will discuss the interpretation of the findings, their implications to the existing knowledge base and offer suggestions for future research.

Figure 13 Factors of Network expansion



6. Discussion

6.1 Summary of the study

For the first time in history, there are more people living in cities than in rural zones. With interconnectivity and information technology as characterizing phenomena of this modern age, the need for fast, convenient food in urban spaces has grown while its quality, cost and delivery varies significantly. To address the societal pressures of food availability and distribution in growing urban nodes, scientific information has been gathered and analyzed in order to provide a sustainable alternative to meet the world's food needs. Industrial ecologist, Dr. Peter Smeets has adopted a few concepts from cluster theory, industrial ecology and triple helix relations to develop the Metropolitan Food Clusters (MFC) model. These spatial clusters of high-productive plant and animal production and processing units combine the input of high levels of knowledge and technology for the exchange of rest-and by products between production chains, creating added value to products, reducing costs and emissions (Smeets, 2011).

Simply put, MFCs function within the context of an interconnected global economy as a system innovation functioning in the current phase of human development in which knowledge and communication technologies drive the formation of network systems worldwide (Castells 2010). The purpose of this study is not to discuss the technological or structural components of MFC development for knowledge exchange but rather to explore how different institutional stakeholders (KENGi) contribute to the adaption process of an innovative concept like an MFC. This conceptual approach is focusing on the capacity of people and how they affect the diffusion of an intelligent agrologistic network.

The hypothesis set forth before my field site reseach began dealt with the influence people have over the success of a project largely dependent on the exchange of new, innovative ideas in the agri-food industry. My speculation is that social relations among people who influence this process are key, if not necessary, for the network formation of MFCs. To test this out, I set out to study the empirical case of a budding MFC in Aguascalientes, Mexico. Before conducting 12, in-depth stakeholder interviews in Spanish, I focused on a literature analysis that linked my hypothesis on network formation to a theoretical framework. Nevertheless, models and theories in studies pertaining to capacity building among stakeholders in a MFC is generally lacking. Previous studies have typically examined transition strategies for metropolitan food clusters that mostly focus on management style or present a conceptual model that outlines the formation of a food cluster. This study departs from the approach taken by other analyses by operationalizing the social processes of KENGi stakeholders for the establishment of an intelligent agrologistic network. Thus, Network Society theory, Social Capital theory, and Communities of Practice were the primary theories used as basis for the inquiry of institutional networking. The questions asked to stakeholders derived from the theories aforementioned and based on a set of goals aimed at discovering the factors that contribute and/or limit network expansion which include:

- To identify stakeholders, their roles, needs, contributions and objectives within Agrosfera
- To identify the risks and obstacles they may face by participating in Agrosfera

In the following section, I will go into critical reflection to highlight the contribution this investigation makes to network development in a MFC by connecting the findings with existing knowledge pertaining to social capital and the formation of CoP's by presenting the most interesting or relevant discoveries.

6.2.1 Review and discussion of network expansion

The results of this study support the prior literature assessment that claims social capital is a crucial component of value networks. My original contribution to this topic is suggesting that social capital is indeed a critical component for MFC development. No matter what type of technical applications, capital investment or expert knowledge is available, without strong social ties among KENGi, the project will eventually face delays and have a lower likelihood of success. The other research question that has been addressed pertains to the creation of a CoP. Based on the qualitative results, I have concluded that the existing KENGi network has the potential to develop into a CoP but certain conditions are not yet available for its creation.

This summation has been determined by analyzing the limiting and/or contributing factors of network expansion in Agrosfera. Based on the results of this central research question that has been answered, the two most relevant factors to consider for network expansion, the creation of social capital and CoP in other MFCs (not just Agrosfera) are: knowledge exchange and trust. I will defend my answers with a critical explanation of why the outcome of the research influences these claims by clarifying this position and connecting it to the theories aforementioned.

6.2.2 Roles

Trust has been identified as a critical factor in network expansion because it facilitates the formation of social capital and increases the willingness of people to share ideas with one another -a fundamental requirement in a CoP. Studying the influence and importance each stakeholder has within the developing KENGi network has identified those who have power over project outcomes and probable coalitions. From the empirical case of Agrosfera, it can be perceived that the inadequate representation of roles and the power imbalance among KENGi in Agrosfera limits this trust from forming and in turn, threatens network expansion by further alienating potential stakeholders.

Here is the reason why; in Agrosfera, KENGi with the most important roles (i.e initiators, executers, approvers) are held by those in the government sector, while some roles (evaluators, monitors) are underrepresented-alongside some institutions like enterprises and NGO's. Monitors/evaluators are needed to sustain momentum and to keep bureaucratic delays at bay (Wubben, 2010). They may help foresee other possible risks or obstacles that may appear along the way and offer aid in avoiding them. These same monitors have a clear picture of the overarching processes and institutional needs of all those involved by helping people stay on target, keeps goals, adhere to deadlines

and promote accountability. This is a key concern when dealing with such a complicated, large-scale project. The need to follow up and be transparent on all accounts is critical and also breeds a culture of trust that helps knowledge be accessible to the public for open discussion. Without the proper means of conveying information to moderate progress and transfer knowledge among the stakeholders, it is difficult to cultivate mutually supportive relations that enhance the formation of trust. By developing more effective communication channels, the performance and impact of those involved is more substantial (O'Brien, 2001) and will help build mutually beneficial relationships that leads to common ground in a developing community of practice (Wenger, Etienne, 2002).

6.2.3 Influence

A central goal in the development of Agrosfera (and eventually, a CoP) is to engage a range of stakeholders from different KENGi in order to expand network linkages and strengthen inter-firm relationships. At the time of the study, insufficient attention was being given to develop these linkages. Besides the role deficiency seen in Agrosfera, the power imbalance among KENGi also limits network formation because it breeds an environment of distrust since a particular KENG institution (in this case, the government sector) has greater power over project outcomes and probable coalitions due to their influence and importance. As stated earlier, key stakeholders are pivotal in the development of the project and because some of the most influential and important decisions makers of Agrosfera are those in the government sector, their term of office is a factor that affects project outcomes. Powerful leaders in the government can push forward towards project completion and new system schemes.

Their weaknesses however, lie in their vulnerable posts as public servants. Bureaucratic inefficiencies, party elections and the complex hierarchy of governing bodies that undermine each others power can all hamper their ability to delegate and complete a set of tasks. Furthermore, if the execution of tasks in their current roles lies short, it creates a climate of confusion and constant delays. This can also be connected with the responses of several participants who stated that the biggest risk with their involvement in an Agropark is congruent with how long a government stakeholder involved in a MFC stays in office. The fear is that if the government sector is so powerful in determining the project outcome but their post as public servants is running out, then the project will run out steam. The importance of government support for the project and how much it relies on a party official for its continuation plays a part in the confidence and trust other stakeholders have in project success. If time is of the essence and governing officials have the power to delegate the direction of where it is headed, then I might make the assumption that the continuation of Agrosfera depends heavily on the government sector. Thus, without the support of certain individuals in office, the project runs the risk of losing momentum. A 2011 FAO report on clusters supports these discoveries and states that often times, political pressures interfere with agri-cluster initiatives (Nogales, 2011, p. 77). The control and decision-making power of certain groups or individuals may give them the means to allocate resources and make decisions on programs and policies for their benefit. What this finding demonstrates is that when a KENG institution holds the majority of power over MFC development, it limits the

formation of social capital to truly manifest because the expected benefits or rewards of collective action are not being used effectively. In other words, value networks are not truly established and neither is their output or usefulness meant for successful project outcomes.

These aforementioned obstacles to network formation seem to form a vicious circle that, in the worst-case scenario, restricts equilibrium in the short run, thereby affecting long-term goals. To elaborate, restraints caused by government inefficiencies, (shift in political party objectives, imbalance of power, bureaucratic setbacks) may impede progress towards the desired goal. Momentum is lost and the delays to land acquisitions, construction of greenhouses, ect., diminish the enthusiasm of interested participants because the objectives set forth are not being met as time passes by. Deflated optimism due to unmet goals along with time misspent makes participants hesitant and risk adverse, so commitment wanes, reputations are damaged and alliances more difficult to create (i.e trust is broken). Without interested participants willing to advance project endeavors and the support from voters that believe this proposed plan contributes to the general well being of their state, elected officials may turn their attention to other matters (priorities change) and the development of the project could be postponed yet again. The chain of events is reinforced by the iteration of the previous one so each obstacle creates another and the pattern repeats itself.

The purpose of this hypothetical scenario is to demonstrate the vulnerability an MFC development project may have when there is a lack of trust, one KENG institution and how all of these factors that inhibit network formation relate with one another determine its success.

6.2.4 Risk and innovation

Besides the impact KENGi roles and power have on building trust for social capital, another aspect that contributes to the importance of establishing a wide and diverse network of stakeholders regards a particular characteristic that committed stakeholders all have in common, which is being open to change and/or innovation. Regardless of which KENGi participant was being interviewed, they all possessed leadership qualities which were apparent in their willingness to overcome challenges, take risks and improve efficiency and/or the well being of others, whether that be in the classroom, senate hall or boardroom. At the same time, many expressed their concern of not attracting other local innovators to participate in Agrosfera to keep momentum going. What this finding suggests is that stakeholders willing to commit to MFC formation are those that have the desire and motivation to change conventional business methods in the agri-business sector.

Marginalization, knowledge gap and a strong cultural tradition of machismo and classism are a few setbacks Mexico faces in an era where competition is global, not just with nearby towns and cities. Smallholders now compete in a demanding global market place where strict standards (e.g., quality, traceability, food safety) are the norm and were there is a greater concentration of vertically integrated food chains (Thompson and Scoones, 2009). In an increasingly uncertain world, KENGi involved in the volatile food system are faced with the pressure to compete in the global marketplace and supply the

demand of a growing urban population. How well an organization or nation "adapts and innovates in an unpredictable environment is a measure of its learning capability (O'Brien, 2010, p.87). Leading nations such as the Netherlands and Finland invest around 2-4% of their GNP in these areas while Mexico only invested .37% in 2007 (The World Bank, 2012). Manuel Castells states that in order to compete globally, increased investment in national R&D activities (financing for creativity) could help nations like Mexico compete (Castells and Cardosa, 2010).

Some ambitious stakeholders that were interviewed stated that they wish to see their country progress by participating in a project like Agrosfera where knowledge exchange that is created leads to advancements in the agri-industry. An innovative system of advanced agrologistics, new technology and unique partnerships like a MFC requires participants that are willing to push boundaries and take risks to make innovation possible. By adopting new practices and governing systems of change, these "third world countries" lagging behind today, could be the leaders of tomorrow. That, at least, is the sentiment that many visionaries involved in this system design wish to make a reality.

Nevertheless, any rewarding and knowledge-generating project such as Agrosfera carries risk. This is especially applicable in a MFC because it is a system innovation that requires a different way of doing business and working together. While having a long-term vision, solving problems in new ways and taking risks are important characteristics that innovators share, it might be difficult to convince actors that still adhere to conventional approaches of agricultural production to invest in a project that incorporates so many methods of change. As strategic management and organization scholars have noted, projects that incorporate greater innovation also entail greater risks and this might not be so appealing to potential stakeholders that are more traditional with their agricultural techniques and business practices (such as keeping the business in the family). Some people may be resistant to the system innovation because it requires new ways of processing information and delegating responsibilities that they are not accustomed to dealing with. Additionally, rural agents who have limited resources and scarce access to markets are less likely to engage in risk taking activities. Because the project entails new production methods and creative business models, it takes proactive leadership from local KENGi visionaries that see Agrosfera as an opportunity rather than a possibility of failure. In summary, not everyone in the agricultural sector will want to take part in the development of a MFC project because it carries risk and uncertainty. In the following section, I will offer a few recommendations that can help nurture relationships to involve more agents of change, address the issue of role distribution and power balance to generate trust and knowledge exchange.

6.3.1 Recommendations

"the most critical issue at this stage is involving people" -M.K

As mentioned in the previous section, creating an enabling environment in which people work well together and in turn, improve the effectiveness of a sustainable MFC is largely determined by social capital and the value it forms. Results of this research show

that role distribution, power structures and the willingness of participants to be open to innovation can make an impact on the trust and knowledge exchange that the KENGi network generates. While the previous section focused on linking the main findings of factors that inhibit/generate network expansion with social capital theory and the CoP model, this section will offer recommendations based on the results that were extrapolated. The two main recommendations based on the gathered results that will be discussed shortly all relate to reducing exclusivity and providing an enabling environment for a CoP to manifest.

6.3.2 Creation of a task force

Findings show that the landscape dialogue is a transdisciplinary process, in which different participants share roles and knowledge with each other and for the development of the Agropark (Smeets, 2011, p.137) but it can be underdeveloped if the appropriate roles are not being filled. In Agrosfera, there is a lack of cohesion among the differing institutional representatives and balance of role division. A more favorable environment would be one in which levels of influence, responsibility and power is diffused among representatives of each institution. Encouraging other institutional representatives to be more engaged in the decision making process of MFC development could increase knowledge exchange and levels of accountability. What this means is that there would be a presence of high functioning collaborations across the board with linkages that connect to the larger processes of the Agrosfera network. One of the steps that could potentially help strengthen bonds among participants in this fashion is to form an executive committee or task force comprised of business leaders, community members and academic representatives and government. A task force comprising of a range of KENGI with different roles and influence could serve the following purposes; keep a system of check and balances, oversee that roles and responsibilities are being successfully met, help maintain project momentum and keep stakeholders well informed on the progress that is being made. This task force could help generate knowledge exchange and would also utilize the leadership qualities that many key stakeholders possess to attract other participants.

The FAO report suggests that adopting collective, decision-making mechanisms strengthens the collaboration of a wide range of private and public sector actors and by promoting administrative and political decentralization, decision-making becomes more transparent and participatory. Similarly, many participants that currently do not have the influence or importance could potentially develop these characteristics as time progresses and as project becomes more mature. The task force could also concentrate its efforts on outreach strategies to boost the gradual involvement of potential stakeholders.

Before sharing resources, engaging the local community and investing in other strategies aforementioned, it seems as though an effective medium to convey information about the project should be created. The visibility of innovation fuels the adoption by followers (Belussi et al., 2010, p.33), so a better implementation of proper outreach channels such as spreading the word, workshops, and media exposure could generate interest.

For example, if stakeholders are afraid that progress is not being made within an adequate amount of time, then this task force could share any information available of the projected timeline of project goals and objectives to quell any unrealistic expectations others may have if this information is not shared. Thus, a task force in Agrosfera could keep the enterprises that have adopted wastewater treatment technology well informed on the progress that is being made and convey any new findings that gives investors a better idea of their estimated return on investment.

Stakeholders who are more knowledgeable about the project and carry more responsibility, build social capital and will more likely engage in the process (i.e the task force) so educating potential stakeholders about what the project entails via outreach methods should be the first step in generating a critical mass of active participants. This leads to my next recommendation.

6.3.3 Developing the domain

In the case of Aguascalientes, asking respondents what Agrosfera means to them revealed that stakeholders are fully aware of the need to collaborate with one another in order to make the system design achievable. All of the respondents mentioned "working together" as part of their definition. This suggests that KENGi stakeholders are perceptive and willing to establish better communication channels to undergo integrative efforts that are currently not so strong. Although it is not explicit, the notion of social capital is valuable to them and consistent across the board. This provides a platform for fruitful dialogue and possible collaborations to take place since the stakeholders know it is an essential component in agropark design. Understanding that an agropark consists of a network of different institutional participants is one of the first steps to establishing common ground and nurturing mutually beneficial relationships.

On the other hand, all KENGi actors have individual objectives they wish to pursue. Some may want to cut costs, others would like to expand their presence in the international market and others yet would like to attract more qualified personnel in the region. Whatever their institutional drive may be, it is unlikely that they will change it simply because a new development project is presented to them. This is important to note because they must find reasons why the project meets their unique needs in order to form a "domain of interest" (Wenger, Etienne, 2012). In the Community of Practice model, the identity of a project is based on a domain where people share their collective competence. With that in mind, one of the ways the web of stakeholders can expand is by determining an area of concern that affects the livelihood of all stakeholders. If the notion of working together is clear, then determining what common issue is important to the group would be the next logical step. In Agrosfera for example, the issue of importance that the majority of actors wish to address is the water shortage affecting Aguascalientes.

As mentioned in Chapter 3, the overexploitation of water resources in Aguascalientes is a major concern that affects the lives of all state residents. With the proper management and communication channels, stakeholders can find a way to pool their resources together for effective solutions to reduce the depletion of their aquifers. This may mean investing in efficient irrigation technologies and introducing better water

resource management courses in a university curriculum. The point to take away from this example is that when stakeholders engage in knowledge exchange by identifying a common need, or issue of importance, then they are able to share their competences that equip them with the tools and resources to tackle this appropriately. With well assigned roles and a designated task force to address an issue of importance, the web of social connections can be strengthened, thus efforts intended to build trust and support among the different stakeholders can lead to a stronger KENGi network.

As the stakeholders themselves have stated, before the manifestation of a strong cluster formation can ensue, social networks need to expand and that requires partnerships based on trust. Agrosfera is seeking to become an innovative metropolitan food cluster dedicated to meeting the food needs of expanding urban populations by adopting methods that prioritize sustainable development practices for the future needs of generations to come. Results have shown however, that strong social network formations are to be established before the physical construction of Agrosfera can be executed.

These findings are not surprising revelations, but instead reaffirm my hypothesis that emphasizes what we already know regarding social capital and its importance to value networks. Nevertheless, new knowledge on the factors determining network expansion in a MFC are helpful in determining next steps for establishing better institutional networking strategies. The study will conclude in the following chapter, where I will summarize this report and share ideas for future research projects.

7. Conclusion

7.1 Summary

As a country that is experiencing tremendous growth, Mexico has the potential to become a leader in sustainable project developments in the Americas. While this path towards innovation contains many unknown variables that could hinder or help an idea take shape, Mexico's involvement in a MFC project exemplifies their aspiration in finding creative solutions and implementing new strategies for progress in the agro-food industry. A venture like Agrosfera introduces new farming practices to a culture that has subsisted from traditional methods for generations and therefore, resistance to such endeavors will occur. While the voyage of discovery and change may entice some, others fear the spur of innovative activity. Even if this system is aimed at improving food security, the local economy and resource management strategies, if people are not willing to participate, then the project will fall through. I argue that creating a network of involved participants is needed for developing sustainable MFCs and by identifying what hinders or nurtures network expansion, better strategies to build capacity among stakeholders can be applied to foster its growth. A strong presence of social capital based on trust based relations then ultimately leads to communities of practice (CoP), which are groups of people who have a shared objective and who want to take steps to achieving it by knowledge sharing and interacting with one another on a regular basis (Murillo, 2011).

The goal of this investigation is to gain a better understanding of the different elements that advance or deter stakeholder relationships from developing in Metropolitan Food Clusters (MFCs). Agrosfera is the emerging MFC in Aguascalientes, Mexico that utilizes technologically advanced systems of agroproduction that are sustainable in design in order to meet the nutritional needs of growing urban populations worldwide. Stakeholders involved in Agrosfera hope that the implementation of this competitive, state-of-the-art project will act as a model of innovation for the country and that it brings forth economic and social development to the state. The study was based on qualitative criteria congruent with my interests regarding sustainable development projects in Latin America and the desire to gain in-depth knowledge on stakeholder participation for effective network formation. I have chosen to study the impact social processes have in the creation of this innovative system design because my conjecture is that the value networks formed via social capital are important in determining project success.

Even though the empirical focus is Agrosfera, the overarching premise relates to social network formation in a MFC. While the theoretical assumptions described in chapter 2 address the core concepts of the thesis and establish the trajectory by which this study has been conducted, the research approach in chapter 4 makes explicit how the variables and relationships that follow from logical argument are operationalized (Sutton and Saw, 2007).

7.2 Findings

After gathering qualitative data in the form of in-depth interviews from participants involved in Agrosfera, interesting insights on institutional networking that may contribute to improved strategies for MFC formation and (CoP) have been formulated.
The stakeholders themselves have confirmed my argument of building alliances as an important first step in the formation of a MFC. There is consensus among the participants that trust among institutional actors is necessary to build connections in Agrosfera. Since after all, the commitment of actors is dependent on trust to make relationships sustainable (O'Brien 2010 p.37). Once established, it paves the way for technological advancement, rural development, knowledge transfer and all the other relevant objectives Agrosfera is seeking to achieve. The process starts with the knowledge and input of all participants and consists of informal meetings of the social networks. In the formative growth period when concrete results have not fully manifested, trust is an important tool for active engagement. Without it, participants lose interest, hesitate to commit and become somewhat mistrustful in the project itself if concrete plans take an exorbitant amount of time to materialize. This is especially true of actors in the private sector whose involvement carries greater monetary risk and a longer rate of return. Perhaps that may be the reason why there are few entrepreneurial institutions fully engaged in the project. Stakeholders have noted that it would be advantageous to engage more enterprises and their involvement, in turn would help generate a critical mass. This can be achieved by finding common issues of importance that are congruent with institutional needs and interest. This could mean sharing resources or facilities and creating a CoP based on the issue of water resource management- a concern that the majority of stakeholders wish to address.

Another finding worth mentioning involves the role institutional actors play in the creation of an innovative MFC. Medium sized enterprises, large state universities, and government consultants all have different capacities and unique interests when it comes to the development of Agrosfera. As a system innovation that aims to strengthen relations between KENGI, MFCs value the role stakeholders have to create a strong network. Identifying stakeholders and their roles was meant to determine if there is a value network present, which encompasses vertical, horizontal and support linkages that are interdependent of one another and to assess stakeholder contribution to the project.

Findings show that like value networks, the roles of stakeholders shift and evolve. Rather than displaying a linear relationship among participants, the role analysis shows the spatial connectivity of entities and resources in a more fluid fashion. The fluidity of movement suggested by the interpretation of network configurations blurs the "spatial patterns, social modalities and structures of governance; where relationality refers to the ways in which domains of collective existence influence and even constitute each other" (Axford, 2006). While this flexibility holds true for stakeholders who assume more than one role, this it is not the case between the different KENG institutions. Their institutional representation is imbalanced.

From what I have been able to establish, key stakeholders are essential to project development. These are individuals who are well-respected members of an organization that hold leadership positions. They have influence in determining important decisions

and the drive to pursue difficult endeavors. Currently, stakeholders with the greatest dominance over the outcome of Agrosfera are government representatives. Likewise, without the support of certain individuals in office, the project runs the risk of losing momentum. While they have contributed to the advancement of the project thus far, their role as civil servants may ultimately halt long-term progress due to their indeterminate position in office and possible bureaucratic delays pertaining to their involvement in contract negotiations, land acquisitions and so forth.

Facilitators also carry an important task but they are currently missing from the overall process. Their involvement is frequently observed in subsequent studies of Communities of Practice and linked to the overall success or failure of the group (Li et al., 2009). They are actors from different institutions who oversee the distribution of information to flow from top down/bottom up, have a clear understanding of the overall mission of the project and are well connected with other members and potential members. They also carry the task of creating structures of downward accountability aimed at informing people of what is happening and for group representation to make an impact (Vorley 2002 p.39).

On the other hand, findings have also shown that all of the stakeholders seem to possess strong leadership characteristics that are desired in a project involving forward thinking initiatives. Agrosfera is the first Metropolitan Food Cluster in the Americas that integrates an intelligent agrologistic network design. Stakeholders expressed that the mentality of many people in Mexico is very traditional and so encountering resistance to novel concepts is unavoidable. With the willingness that current participants have of working together and their ability at taking proactive initiative, the formation of CoP's with institutional actors that want to be implementators of change may have a higher rate of success. While some of the findings provide valuable information to existing knowledge in the field of intelligent network systems and their social networks, many of are obviously specific to the case of Agrosfera. Nevertheless, the aim is to answer the research questions posed in in chapter one.

6.3 Limitations & Recommendations

The aim of this research was to provide a more comprehensive understanding of the factors that may inhibit or contribute network formation in an emerging MFC. I am fully aware that there may be some limitations to the research and so I would like to take this moment to share some setbacks that I encountered. A critical argument relating to this thesis is that the data corresponds to the shared views and opinions of only a select group of people. The stakeholders that have been identified all make unique contributions to the project and many of them have influential roles. Indeed, without the dedication of some, the project would seize to exist. While this has enabled me to collect data from important participants, it is not a very diverse pool of candidates that represent other sectors and interests. It would have been beneficial for me to connect with non-profit organizations or a farmer's cooperative which could shed some light on other actors that are going to be impacted by such a large project in the region. It is important to identify these stakeholders in order to deal with possible opposition and/or possible alliances and try to involve them in the design process as early as possible- or at

the very least identify them and keep them informed of the MFC development in their region. I tried to reach out to these interest groups but it was difficult to connect to those outside the circle of stakeholders that I was surrounded by during my time in Mexico. Nevertheless, the opinions and ideas expressed by the identified stakeholders have all been valuable to my research objectives.

Another critique that I have of my own work involves my general learning process of MFCs and network formation. While my original research objectives involved a more general study of food systems, urbanization and the rural poor, it transformed into research pertaining to social networks and organizational capacity within a competitive cluster. It would have been advantageous for me to have focused more on formulating a precise methodology and better interview questions as well as learn more about business development in agri-clusters. Because I was receiving hand-on experience and developing my theory as I worked in Mexico, I was still learning about the world of MFCs so when the opportunity came to interview, It would have been advantageous to come up with better/more profound, well thought out research questions.

For example, my lack of understanding of the MFC concept in the early phase of project involvement limited my ability to phrase questions appropriately such as asking stakeholders what an agropark means to them. One of the challenges that limits insightful results garnered from this question is the way it is phrased. As mentioned earlier, the grand majority of respondents have limited prior knowledge of an innovative system like Agrosfera. It is difficult to grasp a system of such complexity and therefore, individuals might confuse the term agropark with MFCs, and Agrosfera as something else entirely. Although the term 'agropark' is difficult to define and it is really just one of the three elements of an MFC, perhaps the question itself is misleading. I could have received more eloquent responses or different definitions altogether if I had asked specifically about a MFC. On the other hand, stakeholders with the most knowledge immediately gave a more thorough definition of an agropark (i.e., they were more precise with their wording and differentiated consolidation centers from rural transformation centers). Nevertheless, this rewarding research has led to some interesting findings that are particularly relevant to Agrosfera and has inspired some recommendations that could be applied to other agri-business cluster developments.

To summarize the discussions chapter, one of the first recommendations I would make is to establish a platform or a task force that opens communications channels among KENGi actors. This task force could be responsible for monitoring procedures and facilitating channels of communication that encourages knowledge sharing, help gain support and speed up realization of the project. While a community of practice encourages participation among a range of actors in theory, practical applications need to be set in place first. With a range of actors representing different institutions, this task force could identify where individuals are in the process, who they have connected with, how are they getting others involved, track how knowledge is being shared, if are they keeping momentum going and so forth. Another recommendation involves the outreach and developing the domian of potential participants. An MFC aims at engaging a wide range of actors to build their capacity and educational level in order to compete well in this globalized food system. Finding ways to not only engage strong leaders, but

individuals that are open to learn and invest in innovation could reap greater benefits for the community as a whole. Offering incentives, sharing success stories and using media outlets could develop this engagement and outreach process to gain more participation and ensure project momentum. If the MFC concept actively engages stakeholders within its network to exchange and collaborate through formal and informal methods, it can lead to a basis for trust, which strengthens social capital. Furthermore, attracting risk takers, building trust and involving actors from all institutions are effective ways to engage more participants in the process while expanding the network of visionaries to generate positive systems of change.

Finally, I would like propose some recommendations that could contribute to the development of future studies. The MFC highlighted in this study has received significant support from the local government. There are other MFC initiatives in places like South Africa and India that have received attention and support from other external institutions such as entrepreneurs and the World Bank. It would be interesting to compare and contrast the motivating factors that contribute to KENGi formation among different MFC projects from other parts of the globe. Another area for future research is to study the patterns observed among stakeholders and how network alliances evolve. Due to the dynamic and transitional nature of social behavior among KENGi, a longitudinal study could provide a better understanding of the impact social capital plays for co-innovation in a metropolitan food cluster over time.

Literature cited

Axford, Barrie. (2006). The Dialectic of Borders and Networks in Europe: reviewing 'Topological Presuppositions'. *Comparative European Politics*, 4, 160-182.

Broekhof, S., van der Valk, A. (2010). Planning and the quest for sustainable food systems. Explorations of unknown territory in planning research. Text accepted after peer review for book to be published with Wageningen University Press with selected essays taken from the proceedings of Second AESOP European Sustainable Food Planning Conference in Brighton, October 29th and 30th: Brighton UK.

Belussi, F., Sammarra, A. (2010). *Business Networks in Clusters and Industrial Districts: The governance of the global value chain. London: Routledge.*

Cadena, A., Remes, J., Manyika, J., Dobbs, R. et al. (2011). Building globally competitive cities: The key to Latin America growth. McKinsey Global Institute.

Calridge, T. (2004). *Benefits and Importance of Social Capital.* Retrieved January 30,2013, from http://www.socialcapitalresearch.com/literature/theory/benefits.html

Castells, M. (2010). *The Rise of the Network Society*. West Sussex: Wiley-Blackwell Ltd.

Castells, M., Cardoso, G. (2005). *The Network Society: From knowledge to policy.* Washington D.C: John Hopkins Center for Transatlantic Relations.

Coe, M.N., Yeung H.W. (2001). Mapping Globalization: geographical perspectives on international trade and investment. *Journal of Economic Geography*, 1, 367-380.

Coenen, L., Moodysson, J., Asheim, B., Jonsson, O. (2003). *The Role of Proximities for Knowledge Dynamics in a Cross-border Region: biotechnology in Øresund.* Paper presented at the DRUID Summer conference, Copenhagen.

*Cuentamé: Información por entidad (*2010). Retrieved December 22, 2012, from http://cuentame.inegi.org.mx/monografias/informacion/Ags/Territorio/default.aspx?tema=ME&e=01

Delgado, J. (2012, July 5th). *From Agropark in Queretaro to Agrosfera in Aguascalientes, Mexico.* PowerPoint lecture presented for Floriade in Venlo, The Netherlands.

Department of Economic and Social Affairs Population Division. (2011). *Population distribution, urbanization, internal migration and development : An International perspective.* Expert meeting at United Nations Headquarters. New York.

Dicken, P. (2011). *Global Shift: Mapping the changing contours of the world economy.* London: Sage Publications Inc.

Du Plessis, C. (2008). 'Understanding Cities as Social-ecological Systems.' World Sustainable Building Conference – SB'08, Melbourne, Australia, 21-25 September.

Ease of doing business in Aguascalientes (2012). Retrieved December 22, 2012, from http://www.doingbusiness.org/data/exploreeconomies/mexico/sub/aguascalientes/

Ericksen, P.J., Conceptualizing food systems for global environmental change research. Global Environmental Change(2007), doi:10.1016/j.gloenvcha.2007.09.002.

Etzkowitz, Henry. (2011). The Triple Helix of University-Industry-Government: Implications for Policy Evaluation. *Science Policy Institute*, working paper.

Etzkowitz, K., Marsden T., Murdoch, J. (2009). *Worlds of Food: Place Power, and Provenance in the Food Chain.* New York: Oxford University Press.

Friedmann, H. (1982). The Political Economy of Food: The Rise and Fall of the Postwar International Food Order. *American Journal of Sociology,* AJS Volume *88, 2*48-286.

Graham, A., Aubry, S., Kunnemann,R., Suarez, S., 2010, "Land Grab Study: The Impact of Europe's Policies and Practices on African Agriculture and Food Security", *CSO Monitoring Group, AAA.*

Groot, A.M. (n.d). Stakeholder Matrices Guideline. ICRA Learning Materials. Retrieved from http://www.icra-edu.org/objects/anglolearn/Stakeholder_Matrices-Guidelines(new).pdf

Halgin, D. (2012). An introduction to Social Network Theory. Retrieved from http://historial.pastoralsj.org/jesuitnetworking/docs/Halgin_Social_Network_Theory.pdf

Hiddink, J.G., Kaiser, M.J. (2005). Implications of Leibig's law of the minimum for the use of ecological indicators based on abundance. *Ecography* 28(2), 264-271.

IFAD. (2009). Good Practices in Participatory Mapping. Rome: International Fund for Agricultural Development (IFAD). Retrieved August 10, 2011.

Jessop, Bob. (2004). *Multilevel Governance and Multilevel Metagovernance: Changes in the EU as integral moments in the transformation and reorientation of contemporary statehood*. In: Multi-level Governance. Oxford University Press, Oxford.

Karen C Seto et al.(2010). The New Geography of Contemporary Urbanization and the Environment. Annual Review Environmental Resources.

Kilpatrick, S., Falk, I. (2003): *Learning in agriculture: building social capital in island communities, Local Environment*: The International Journal of Justice and Sustainability, 8:5, 501-512

Knaup, H.,von Mittelstaedt, J. "Foreign Investors Snap up African Farmland" *Spiegel Online* ,July 2009. Retrieved from: http://www.spiegel.de/international/world/0,1518,639224,00.html

"Land and Power: The Growing Scandal Surrounding the New Wave of Investments in Land" *Oxfam International*, September 2011. ISBN 978-1-84814-947-2.

Leatherman, T.L., Goodman, A. (2005). Coca-colonization of diets in the Yucatan. Social Science and Medicine 61 p.833-846

Leydesdorff, L. (2005). The Triple Helix Model and the Study of Knowledge-Based Innovation Systems. *International Journal of Contemporary Sociology,* Volume 42, no. 1.

Li, L.C., Grimshaw, J.M., Nielsen, C., Judd, M., Coyte, P.C., Graham, I.D. (2009). Evolution of Wenger's concept of community of practice. *Implementation Science,* 4:11.

Mann, Howard. "Foreign Land Purchases for Agriculture: What Impact on Sustainable Development"? *Sustainable Development Innovation Briefs*. January, 2010.Retrieved from http://www.un.org/esa/dsd/resources/res_pdfs/publications/ib/no8.pdf

Mansfeld, M., Buijs, S., Smeets, P., van der Valk, O., et al. (2012). *Sustainable development of a Metropolitan Food Cluster Agrosfera, Aguascalientes Mexico; Feasibility Report:* Wageningen University and Research

Mayers, J. (2005). *Stakeholder Power Analysis.* Policy Power tools, IIED.

Muller, L., Webster, D. (n.d). "Peri-Urbanization: Zones of Rural-Urban Transition" Human Settlement Development -Volume I Sample Chapters 281-288.

Nissan News Releases (2012, January 25). Nissan to build new, $2.0 billion manufacturing complex in Aguscalientes, Mexico, grow capacity in the Americas. *Nissan.* Retrieved from http://www.nissan-global.com/EN/NEWS/2012/_STORY/120125-04-e.html

Nogales, Eva. (2010). *Agro-based clusters in developing countries: Staying competitive in a globalized economy.* Rome: Food and Agriculture Organization of the United Nations.

O'Brien, R. (2001). *Trust: Releasing the Energy to Succeed*. West Sussex: Wiley-Blackwell Ltd.

(2009, May 21). Outsourcing's Third Wave: Buying Farmland Abroad. *The Economist.* Retrieved from http://www.economist.com/node/13692889

Pimbert, M., Thompson, J., Vorley, W., Fox, T., Kanji, N., Tacoli,.C. (2001) Global Restructuring , Agri-Food Systems and Livelihoods. *Gatekeeper Series*, no.100.

Porter, M. (Speaker). (2008, January 22). *Clusters Innovation and Competitiveness.* Speech presented at EU conference on innovation and clusters in Stockholm Sweden.

Sassen, S. Locating Cities on Global Circuits. Environment and Urbanization Vol 14 no 1 April 2002 University of Chicago Globalization and cities.

Satterthwaite, D., McGranahan, G., Tacoli, C. (2010). Urbanization and its implications for food and farming. *Phil. Trans. R. Soc. B*, 365, 2809-2820.

Saunders, M., Lewis, P., Thornhill, A. (2009). *Research Methods for Business Students.* Essex: Pearson Education Ltd.

Smeets, Peter. (2011). *Expedition Agroparks: Research by design into sustainable development and agriculture in the Network society*. The Netherlands: Wageningen Academic Publishers.

Smeets, P., van Mansfeld, M., Kranendonk, R., Gerritsen, A., Dirksen, J. (2012). *Metropolitan Food Clusters: Sustainable food for the 21st century global urban society.* PowerPoint lecture presented for the Ambassador of the Netherlands in Aguascalientes, Mexico.

Strategic Management: SWOT Analysis. (2010). Retrieved December 15, 2012, from http://www.netmba.com/strategy/swot/

The World Bank. (2012). Retrieved December 22, 2012, from http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?page=1

Thomas, D. 2006. A general inductive approach for qualitative analysis. *American Journal of Evaluation,* 27(2), 237-246.

Thompson, J., Scoones, I. (2009). Addressing the dynamics of agri-food systems: an emerging agenda for social science research. *Environmental Science and Policy,* Volume 12, Issue 4, 386-397.

United Nations. (2008). *World Urbanization Prospects: The 2007 Revision*. New York: United Nations.

Vorley, Bill. (2002). *Sustaining Agriculture: Policy, Governance, and the future of Family-based Farming. A synthesis report of the collaborative research project 'policies that work for sustainable agriculture and regenerating rural livelyhoods'.* London: IIED.

Wenger, Etienne. (2002) *Cultivating Communities of Practice: a quick start-up guide (*Image graph), Retrieved February 8, 2013 from: http://knowledgecafe.care2share.wikispaces.net/file/view/CoPStartup.jpg

Wenger, Etienne. (2012). *Communities of Practice: A brief introduction*. Retrieved January 7, 2012 from: http://wenger-trayner.com/wp-content/uploads/2012/01/06-Brief-introduction-to-communities-of-practice.pdf

Williams, K., Durrance, J.C. (2008). Social Networks and Social Capital: Rethinking Theory in Community Informatics. *Journal of Community Informatics, 4(3).*

Wubben, E., Isakhanyan, G. (2011). Stakeholder Analysis of Agroparks. *International Food System Dynamics,* 2 (2), 145-154.

Zurich Financial Business Services Group. (2011). *Risk Management in a Time of Uncertainty*. Zurich: Harvard Business school.

Summary Brief

From its humble origins as a postal service rest stop between Mexico City and Zacatecas, the city of Aguascalientes in central Mexico has developed into a thriving hub of commerce and industry. Industrial export facilities, expanding transportation channels and a well-capitalized financial system have contributed to regional growth in recent years. As the economic climate continues to transform, so too does the spatial arrangement of this city in motion. While new construction and congested streets may be a sign of relative population density and market expansion on a local scale, the dramatic shift in socio-spatial configurations is largely influenced by the interconnectivity of socio-economic processes that encompass global dimensions.

The new project development of Agrosfera, a Metropolitan Food Cluster in Aguascalientes demonstrates the interconnectedness in the global food system. Agrosfera is the integration of the rural supply chain along with other production regions and satellite farms, centered around a large scale processing unit to reduce transportation, energy costs and serve the need of the nearby metropolitan market. This intelligent Agro Logistic Network system also houses secondary functions such as training facilities, rural housing and health services. Some of the most beneficial outcomes of this design include the use of waste flows from different interconnected chains, spatial clustering that results in a more efficient use of space and thirdly, the creation of an innovative network that involves different participants from different fields and knowledge specializations that are tied together by a common objective.

While the spatial planning of Metropolitan Food Clusters (MFC) relies heavily on knowledge and innovation as engines for sustainable growth, the question remains as to how these new sustainable models of agro-production rely on social capital in this time-compressed reality. The aim of this research is to examine network formation in an MFC project like Agrosfera to discover better management practices that can be applied to optimize its performance and create a community of practice, where participants can cultivate a space to exchange knowledge and share resources.

Summary of research

Objectives:	-To identify the factors contributing to and limiting network expansion in a Metropolitan Food Cluster (MFC) called Agrosfera. -To evaluate the evidence of Communities of Practice (CoP) in Agrosfera.
Search strategy:	-Searched literature published between 2001- 2012 -Database research & management: Radboud repository, Google scholar, Endnote, IESBS, JSTOR, Mendeley, MindMap - Reading of Peter Smeets book on Agroparks and Aguascalientes Feasibility reports provided by Wageningen University. -Stakeholder-based approach: -12 in-depth interviews - Influence/importance matrix -SWOT analysis -Observational learning -Travel to Aguascalientes, meeting participation, site visits
Eligibility criteria:	Representation of KENGi actors (knowledge institutions, Enterprises, Non-governmental organizations and Government), primary studies that involved food systems, urbanization, cluster development, organizational capacity network embeddedness and other related concepts as the guiding framework.
Synthesis approach:	Stakeholder The research synthesis focused on: -Identifying roles & identity -Issues of importance -Risks & obstacles -Key characteristics for building alliances
Search Results:	(52) relevant publications, (4) lectures/presentations, several hours of transcribed interviews.
Key findings:	Contributing elements for network expansion in Agrosfera: -Engagement of more enterprises could have a significant

impact on project momentum
-Willingness of stakeholders to work together
-Physical vicinity of markets and other actors
-Common characteristics among all KENGi stakeholders: leadership mentality, ambitious, innovative and risk takers

Impediments to network expansion in Agrosfera:

-Concentration of power is not dispersed evenly among stakeholders
-Weak communication channels among KENGi
-Political restraints
-Role of facilitators and monitors/evaluators is lacking
-Resistance to change can be attributed to cultural differences relating to generational and family influence.
-The lack of concrete plans & bureaucratic delays diminishes commitment

While there are influential stakeholders present in the current phase of the project to form a solid network, a Community of Practice (CoP) is not present.

Suggestions:

1. Attract more leaders/risk takers, people open to innovation & create a task force of KENGi representatives (formation of transparent communication channels
2. Stimulate joint access for markets
3. Take advantage of geographical vicinity to increase cooperation and participant accessibility
4. Stay aware of common goal objectives to hinder any bureaucratic setbacks/red tape
5. Trust building between actors; identify problems, foster solutions; active intervention
6. Highlight success stories, foster optimism to keep momentum

Interviews

Delgado, J. (2012). Executive Director of FOCIR. Interviewed the 29th of May in Aguascalientes.

Carvallo, F. (2012). Director of Competitive sectorial intelligence of FOCIR. Interviewed the 28th of May in Aguascalientes.

Velazquez, E. (2012). Director of Strategic Projects, SEDRAE. Interviewed the 1st of June in Aguascalientes

Narvaez, J. (2012). Secretary of Rural development, Ministry of Agriculture, Livestock, Rural development, Fisheries and food (SAGARPA). Interviewed the 28th of May in Aguascalientes.

Koopmans, M. (2012). Microalgae Researcher, University of Queretaro. Interviewed the 6th of June in Wageningen.

Alba, L. (2012). Director, Instituto Tecnológico de Pabellón de Arteaga. Interviewed the 15th of June via Skype.

Benavides, H. (2012). CEO, Agro Depot. Interviewed the 4th of July in Venlo.

Rojas, C. (2012). Director of Special Projects, Vali. Interviewed the 4th of July in Venlo.

Medrano, J. (2012). CEO, Frio Express. Interviewed the 5th of July in Venlo.

Olivares, T. (2012). CEO, Ventura & President of Consejo Estatal Agropecuario (CEA). Interviewed the 24th of July via Skype.

Smeets, P. (2012). Project Manager, Alterra Wageningen UR. Interviewed the 12th of September in Nijmegen.