TRACK 4. TRAINING AND JOBS

The track focuses on the various ways through which educational and training programmes deal with sustainable food planning, and how they provide a specific know-how for for future professional in this field.

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SERVICE-LEARNING AND URBAN AGRICULTURE IN DESIGN STUDIOS

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Keywords: Service-Learning, Design, Studio, Urban, Agriculture

Abstract: A design studio in a department of Landscape Architecture in the rural South Eastern portion of the United States of America set out to collaborate with community non-profits, policy makers, and design professionals to provide students opportunities to work with clients in the field. Students were asked to inventory and analyze conditions of multiple sites in multiple rural communities to assess possible sites for community markets and shared public spaces. From these early studies, students went through the design process to develop strategies for communities to develop sites and provide marketing drawings. Discussions from local historians, economic developers, politicians, and citizens helped form a more integrated view of how these conditions could exist within traditional agricultural regions. Real sites with real clients motivated students to find innovative solutions to issues such as obesity, heat island mortality, passive and active recreation, and bridging the gap between groups with cultural, economic, and societal differences. This study focuses on identifying local opportunities for service learning projects and the opportunities to lessen the effects of food deserts in rural areas. A discussion of the advantages and disadvantages of the process, place creation, and health benefits is developed for those wanting to utilize a service-learning pedagogy in the classroom for planning and designing ecologically sensitive sites. Community, student, and team reflection on the projects will also be discussed giving insight to the process from multiple points of view.

1. Introduction

Service-learning is one of the pedagogical vehicles that offer one of the best opportunities to accomplish both 'service' and 'learning' objectives without compromising the primary objectives of either goal. It offers the opportunity for today's young people and tomorrow's leaders to learn, while addressing local and regional needs. Today, the term "service-learning" has been used to characterize a wide array of experiential education endeavors, from volunteer and community service projects to field studies. Service-learning is not a new concept and there are an accumulating number of scholarly endeavors studying its uses, pedagogical and community benefits, but there seems to be fewer scholarly endeavors studying its applications in landscape architectural curricula (Artunç & Sabaz, 2009; Artunç & Kurtaslan, 2011; Artunç, Fulford, Gallo & Hesielt, 2014).

Since the mid-1990's, service-learning has spread rapidly throughout communities, K-12 institutions, and colleges and universities in the U.S.A (The National Service-Learning Clearinghouse, 1994 & NCSL, 2002). A report, entitled "*Learning in Deed*" from the National Commission on Service-Learning (Fiske, 2001) quoted National Center for Education Statistics (NCES) estimates that in the 2000-2001 academic year, more than 13 million school students were involved in service and service-learning. NCES also found that between 1984 and 1997, the number of K-12 students involved in service-learning programs rose from 900,000 to over 12.6 million while the proportion of high school students participating in service-learning grew from 2 percent to 25 percent during the same time

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period. A similar increase has also been observed with the service-learning in the colleges and universities in the U.S.A.

Although the curricula in landscape architecture programs have always had projects and case studies in their communities, the most of these studies were not organized and/or recognized as service-learning efforts both for pedagogical and organizational reasons. Lack of an organized public participation though identification of a community partner, and service-learning pedagogy oriented course syllabus and requirements of project statements including but not limited to not having a reflective component as a part of course or project were among some of the reasons for not earning the recognition of service and outreach efforts as service-learning contributions. However, more landscape architecture programs taking advantage of the service-learning opportunities and support provided by their universities as service-learning has become an important factor in assessment of academic and scholarly productivity and effectiveness of the programs as well as faculty in the U.S.A.

Service-learning in developing countries has another important dimension. Especially in countries where landscape architectural education is relatively new, and therefore; there are not sufficient numbers of professionals to contribute utilizing students in landscape architecture to provide community service for their communities (and nations) can contribute greatly toward protection of public safety, health, and welfare and thus provide a positive example of environmental stewardship.

Service-learning is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities (Eyler and Giles, 1999; Stanton, 1990). It is generally combined with **project based** learning. Even though there are many different interpretations of service-learning as well as different objectives and contexts, we can say that there is a core concept upon which all seem to agree:

Service-learning combines service objectives with learning objectives with the intent that the activity changes both the recipient and the provider of the service. This is accomplished by combining service tasks with structured opportunities that link the task to self-reflection, self-discovery, and the acquisition and comprehension of values, knowledge, skills, and abilities (KSA) content.

Service-learning may also reflect on participants’ personal and career interests in science, the environment, public policy or other related areas. Thus, we see that service-learning combines SERVICE with LEARNING in intentional ways. There are many illustrations of how the combination is transforming to both community and students. This is not to say that volunteer activities without a learning component are less important than service-learning, but that the two approaches are fundamentally different activities with different objectives. Both are valued components of a national effort to increase citizen involvement in community service, and at every age (NCSL, 2002).

Service-learning achieves a higher degree of learning because it successfully employs more effective parameters of learning. The following diagram illustrates why service-learning is more successful in teaching and learning according to the U.S. National Training Laboratory research data on “Average Learning Retention Rates” with the Learning Pyramid:

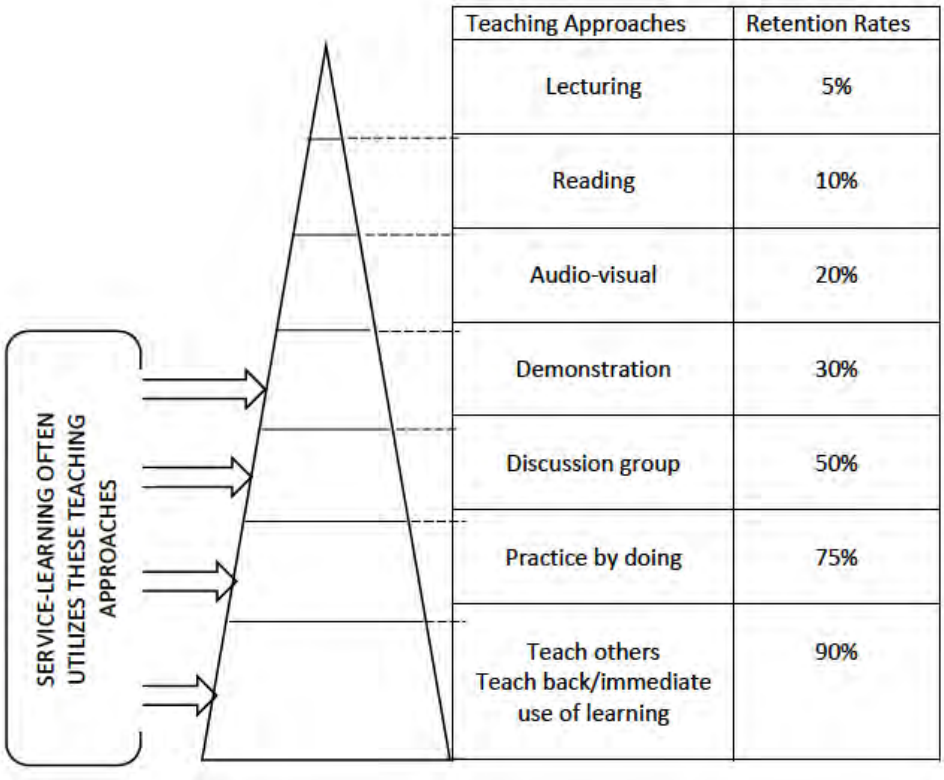

Figure 1. Service-learning vs. Learning Pyramid and Retention Rates of the Knowledge

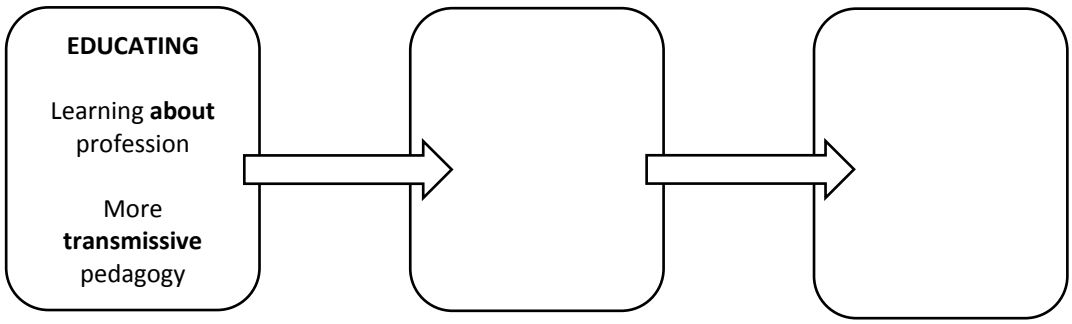

Figure 2. Three models of learning: (1) Educating, (2) Enabling, (3) Exploring

While traditional teaching theories emphasize "educating" model, the emerging theories seek to provide a better balance between these three models. As an critical facilitator of emerging theories, service-learning not only allows more retention of the knowledge but also facilitates a better balance of teaching outcomes among educating, enabling, and exploring and thus rebalancing the focus of learning as illustrated in Figure 3 Traditional vs. Emerging Emphasis:

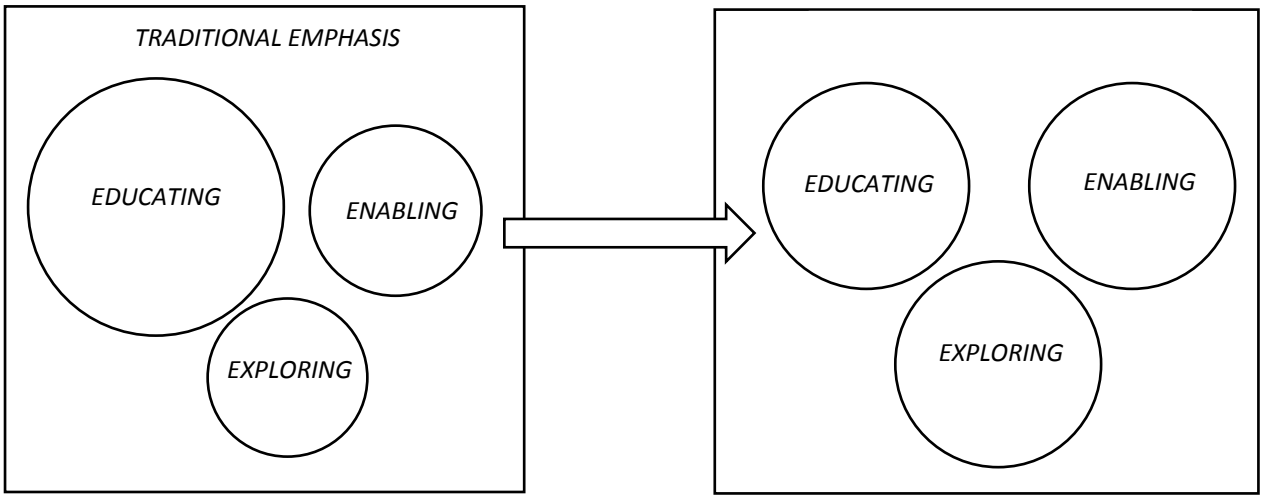

Figure 3. Traditional Emphasis vs. Emerging Emphasis

As a result, learners are better prepared for the challenges of the future. Service-learning serves as a platform to blend disciplinary knowledge, civic knowledge, academic engagement and civic engagement as illustrated in the following diagram:

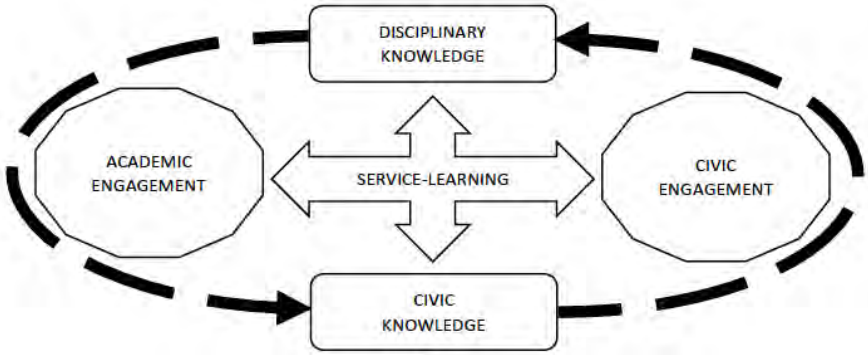

Figure 3. Service-learning platform

Service-learning achieves its objective when the focus between 'learning' and 'service' is balanced.

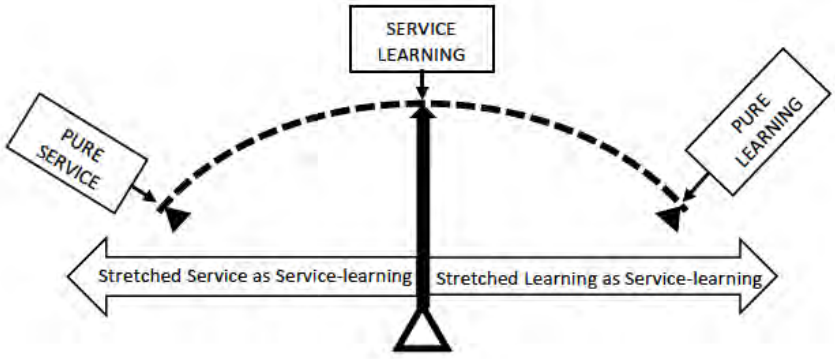

Figure 4. Balanced service and learning

In Figure 5, Service-learning accomplishes goals of both curricula and a meaningful service. Service-learning employs (1) active learning, (2) discovery (research) learning, and (3) professional learning simultaneously.

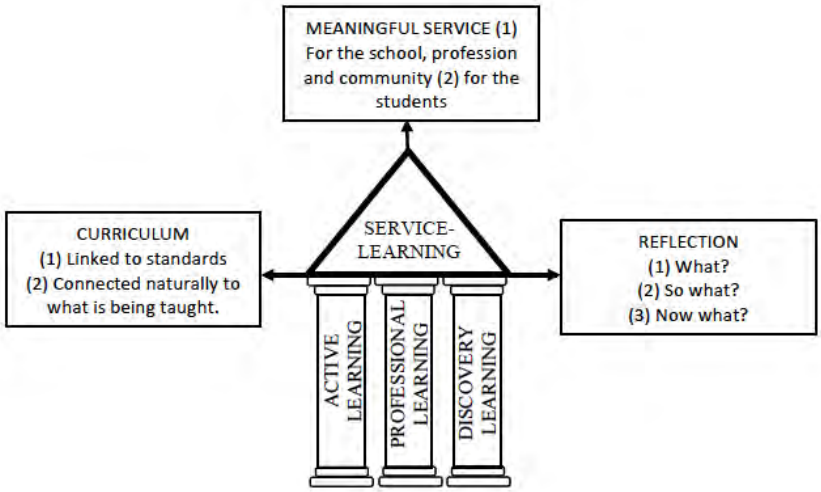

Figure 5. Balanced service and learning

Service-learning instills theory and practice of service, values of empathy and reciprocity through critical reflection, integration, insight and identity formation. Process of research and professional education through inquiry, analysis, synthesis advances knowledge. Research in service-learning disseminates the knowledge through field research, civic engagement and community benefit. Observed outcomes of service-learning are socially responsible daily behavior, advocacy through community education, community building, community economic development, political awareness and activism, direct action strategies and direct service. Service-learning is an experiential education approach based on "reciprocal learning". Service-learning occurs when there is a balance between the learning goals and service outcomes. Therefore, service-learning really occurs only if "both the providers and recipients of service benefit from these activities" (Furco, 1996). Furco presents five types of service programs distinguished by (1) primary purpose and focus, (2) defined by primary beneficiary:

Table 1. Type of Service Program, Focus, and Beneficiary

Type of Service Program	Primary Focus	Primary Beneficiary
1 - Volunteerism	Service	Recipient
2 - Community Service	Service	Recipient & Provider
3 - Internship	Learning	Provider
4 - Field Education	Learning & Service	Provider
5 - Service-learning	Learning & Service	Provider & Recipient

It is important to further note the difference between community service and service-learning beyond their primary focus. Service-learning targets development of cognitive skills, has more

rigorous assessment and selection criteria, it is a work-based or project-based learning for the student, and enhances academic development (Furco and Billing, 2002).
Benefits of service-learning may be easily observed in all six of the educational domains: (1) Academic, (2) Vocational, (3) Personal, (4) Civic/Cultural, (5) Ethical, (6) Social. Providing students with service-learning experiences generate a cycle of change as they progress through their curriculum thus become both a better learner and a better citizen.

Service-learning may be conceptualized in the following four categories (Butin, 2003):

- **Technical**: Focuses on the innovation (advancing the knowledge) itself. Attempts to create best practices and their principles.
- **Cultural**: Emphasizes individual meaning within the context of innovation (acculturation, understanding and appropriation of innovation).
- **Political**: Concerned with issues of competing constituencies and their manifestation through power imbalances.
- **Post-structural**: Concerned with how an innovation constructs, reinforces, or disrupts social norms.

Service-learning often simultaneously utilize these categories and thus have a multiple-perspective focus to lead conceptualization of a diverse set of goals and enactments. Service-learning endeavors in the Department of Landscape Architecture at Mississippi State University often have multiple-perspective focus such as small town planning and design in rural communities in Mississippi. These projects often involve mixed land uses including but not limited to agriculture, urban agriculture, urban homesteading, et.al. as a part of providing better food security and healthy living as well as improved quality of life.

2. Service-Learning in Landscape Architecture Studios at Mississippi State University

2.1 Background

Mississippi State University is located in the East-Central part of the state of Mississippi in the South Eastern portion of the United States of America. With a population of under three million people on 47,000 square miles, it is highly rural in character with a relatively low density of people across the state. Mississippi State University is a Land Grant Institution with land provided by the Morrill Acts. The definition of a land-grant institution is "an institution that has been designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890. The original mission of these institutions, as set forth in the first Morrill Act, was to teach agriculture, military tactics, and the mechanic arts as well as classical studies so that members of the working classes could obtain a liberal, practical education" (http://ext.wsu.edu/documents/landgrant.pdf). Through this designation the university has agents in each county to aid with community development, policy, and other issues that pertain to the wellbeing of the community. The vision of the university is not only about teaching and learning, but also service. As part of the design studio sequence the faculty of the Department of Landscape Architecture began to collaborate on ways to utilize this method of thinking to get our students into the field to work with communities that wanted design intervention but did not have the funding to hire a landscape architect to do the work. Our department did not want to compete with professional landscape architect but rather produce conceptual ideas that could then be turned over to a Landscape Architect for massaging and construction documents.

2.2 Demographics

Mississippi is a place that in 2015 had a child poverty rate of 35%, a senior poverty rate 0f 18%, and has 25.9 %of women in the state in poverty. Single parent families with related children that are below poverty is at 47%. The number of black children below 200% poverty is 253,000 (http://www.spotlightonpoverty.org/map-detail.aspx?state=Mississippi). Its these types of numbers that have given the importance to going out into the field to help the people of Mississippi. Along with poverty comes food deserts. "Food deserts are defined as urban neighbourhoods and rural towns without ready access to fresh, healthy, and affordable food. Instead of supermarkets and grocery stores, these communities may have no food access or are served only by fast food restaurants and convenience stores that offer few healthy, affordable food options. The lack of access contributes to a poor diet and can lead to higher levels of obesity and other diet-related diseases, such as diabetes and heart disease"
(http://apps.ams.usda.gov/fooddeserts/fooddeserts.aspx). Many counties in the agriculturally rich Mississippi Delta Region contain food deserts. Poverty and the conversion of food crops to biofuels have created the issues surrounding fresh foods.

2.3 Opportunities

2.3.1 Henson Creative Park

At Mississippi State University there are many avenues to explore in terms of team building for projects. The department of Landscape Architecture had the opportunity to begin building a relationship with the John C. Stennis Institute of Government. This group had been developed from a past team with the title of the Mississippi Community Action Team which went into communities to facilitate visual preference studies. Dr. Joseph Fratesi and Jeremy Murdock managed small grants from groups such as the Appalachian Regional Commission to help develop opportunities for design intervention. The group had approached the department concerning a team effort for a design studio beginning in Leland, Mississippi located in the Delta Region. The collaboration was not only limited to the resources already in place at the Stennis institute but also by building a team on the ground in Leland composed of local politicians and citizens to help get input for design solutions. The team grew to include members of the chamber of commerce, local artist, the local school board and teachers, as well as an environmental engineering group that heard of the project and offered their services to relocate an existing weir on a proposed park site. The service-learning worked both ways as the students walked the city, the citizens interacted with them answering questions our students had while they were inventorying the sites to be conceptually developed. Local service groups prepared and gave us meals in return for a brief talk about our hopes for the city (Figure 6). A local citizen that had a large unoccupied home allowed the students to stay the night at the house so we didn't need to find more money for the stay over. This house was one of the jewels for the project as some of the members of the city team eventually bought the property and turned it into an award winning bed and breakfast that caters to weddings and guests from the region bringing tax dollars to a town that needed economic development drastically (Figure 7). The city engineer donated survey work. In the early days of the project many people and groups came together to get ideas generated. Our students spent two nights and three days on in the city sketching, meeting with citizens, and trying to find the soul of the place. We met with local historians, the mayor, and everyone that stopped students to find out why they were in their town. Our students had the opportunity to speak with the media, sketch multiple sites around the town, and finally present finding to the city (Fig. 8, Fig. 9, and Fig. 10)

Figure 6. Dr. Joe Fratesi Speaking with Rotary Club Members

Figure 7. Home for the site visit, later later turned into Bed and Breakfast

Figure 8. Student speaking with local media

Figure 9. Students Sketching along Deer Creek

Figure 10. Students Presenting conceptual ideas to community

This process led to the development of a team of players from the city, the Stennis Institute, the Department of Landscape Architecture, and Landscape Architect Robert Poore of Native Habitats to apply for a National Endowment of the Arts Grant to develop design drawings for the Henson Creative Park along the banks of Deer Creek adjacent to a museum for Jim Henson, creator of Kermit the Frog and the Muppets. Background information from the students work on the site were used to show the committee that work had been done on the site and that the city was serious about developing the park. The grant was awarded to the team and over the next year design work was completed for the park. Students also took part at this time by building three-dimensional models and producing marketing images for the city to use to raise funds (Fig. 11). These images all received feedback from the Landscape Architect and the city fostering more learning opportunities for students.

Figure 10. Student Renderings for Marketing Purposes

Students in the Cost Estimating class in our Landscape Contracting and Management major developed a rough estimate for the project based on plans by the landscape architect and will be providing the City of Leland with a yearly management estimate in the Spring of 2016. The partnership with the people of Leland gave rise to many learning opportunities and developed a pride in the students as they worked on what is becoming a real project. The value of developing open recreation space for people to gather in a town that needs to work more closely together was something sensed early by the students as they walked the streets and spoke with the people that will be utilizing these spaces over time. The full value of the park as a market is yet to be seen, but if the bringing together of farmers, artists, and the local citizens can begin to develop dialog about local food, obesity, sustainability, and the arts, then it is already a success. Students gained a valuable insight to working with communities and that they have power to make change in the places they choose to live and work.

2.3.2 Arkwings

Our department became involved with a service-learning opportunity with the Arkwings Foundation as the founder was the father of one of our departments graduate students. Dr. John McCall contacted us and asked if a class would be interested in coming to Memphis, Tennessee to help with master planning of his foundation. “Arkwings Foundation is a multi-ministry wellness organization incorporated as a 501 (c) 3 not-for-profit public charity founded in 1991. It mission is to promote spiritual, emotional, and physical health for individuals, organizations, and communities through innovative, hands-on programs, with a focus on inner-city youth. Arkwings under the direction of Dr. John McCall and a 20-member board of directors also organizes and leads groups of individuals desiring to participate in wellness retreats and to serve in national and international locations. The Arkwings motto is “Taking Care of Self in order to Care for Others” (God, Neighbor, Self). The Arkwings Foundation headquarters is located on a 17 acre multi-facility retreat conference center surrounded by old growth forest in the community of Frayser just north of downtown Memphis. Volunteers are needed to mentor youth through urban gardening programs, to participate in facility improvement projects, and serve in its various ministries” - John McCall. When visiting the site with students Dr. McCall explained the purpose of the foundation and talked at length about teaching inner city children about gardening, nutrition, and how to turn that knowledge base into a career. Our students spent three days at the site, first hearing about the history of the site and the local canoe/kayaking ports. We take the students each year we do the project on a canoe trip down the river so that they can see some of the issues with pollution in our waterways Fig. 11. Members from

Figure 11. Students canoeing and Picking up Trash along the Wolf River

the Wolf River Conservancy donate the boats and discuss the issues in the watershed with the students. The end result is that the students haul trash out of the environment that would have eventually made it to the Mississippi River and ultimately to the Gulf of Mexico. Each year there is a charrette focusing on different aspect of the property. The first year focused on a Master Plan (Fig. 12) and subsequent years have focused on housing, community agriculture, and small markets for selling produce grown by the children. The participants in the gardening effort all are asked to take part in the design development to help students understand the needs of the user. Each year we have local landscape architects help with critiques while developers and engineers give background information etc. Students have been hired by the foundation to make models and create digital images of the site and the department of Landscape Architecture has been an ongoing supporter of the project. The site is one of the last stands of old growth forest in the region with open space along a major thoroughfare in the city of Memphis, allowing for good access to the market and agricultural fields. A recent venture is also growing honey on the site and selling locally.

Figure 12. Early Conceptual Design for the Arkwings site

Student learning included interaction with local environmentalist, food and nutrition specialist, housing developers, and a non-profit that actively worked in the community to raise awareness about local food in and underserved area. The discussions with students taking part in the urban gardens project were eye-opening to our students as issues such as poverty, homelessness, broken families due to drug addiction or jail time were on the fore front. The majority of our students had not experienced those issues first hand and had empathy for those children, making the work they were doing that more important to them.

2.3.3 Water Valley

Another project that was a collaboration with the Stennis Institute was in Water Valley, Mississippi. The Stennis Institute was approached about the possibility of developing conceptual plans for a temporary park on the site of a burned down structure on the town’s main street. We worked alongside with a retired botanist from the University of Mississippi, the President of the locally owned bank, and two local entrepreneurs. In a two-week project the students created a Master Plan, perspectives, sections, and details and took these back to the community for input. This project provided a wonderful opportunity for our students to work with a main street association and multiple members of the community that wanted to see positive change. We were also able to

educate the citizens about what it is that landscape architects are capable of as the initial reaction was that our students were there to plant trees. The relationship was wonderful for both sides of the collaboration. The team chose the work of a student that decided to develop the temporary park as a

Figure 13. Members of the Water Valley teams discuss student work

local food market on the weekend and passive recreation area during the week. The project that was selected was then put together in a marketing flyer to help recruit new clients to the Stennis Center and design studio. The project gained community support and is under construction. Another collaborator on the project was Mississippi State University’s public relations department that put out the story state wide about the project. The students were rewarded not only by knowing that they had helped work on a project that would be built and provide an opportunity for people in the town to get fresh local food, but also with a feel good story about their hard work. Our department received good feedback from parents, administrators, and citizens alike about the work we are doing.

3. Conclusions

The use of service-learning in the landscape architecture studio has been mutually beneficial to students, faculty, and local groups whether they are private or public entities. The ability for design students to meet with real clients and have real world sites with real world problems provides an ownership of the project for the students. Students gain real experience with communicating conceptual ideas to communities that otherwise would not be able to afford consultation. The students have an opportunity to learn about the place they are working with and the people that make it home. These are not simple technical solutions derived at a desk far away from ground zero, but in the trenches with citizens that want to make their community better. Students take away from the experience not only pride in providing a design that may be part of a solution for the community, but also new friendships, contacts, and an appreciation for work in less glamorous places around the world, places where people need and appreciate the ideas and effort provided by these students. The partnership between multiple departments on campus and the communities also are mutually beneficial in that new relationships are being made with each project. Each group brings something important to the table in the collaboration that makes the whole project work. One group may find funding while another locates a place to stay in the community or locations to be examined. The community comes away with a product that can be shown to the greater citizenry to solve whatever

topic was important to the project. Issues such as food deserts, public markets, housing, recreation, or any multitude of others are common to explore in the design studio and give an opportunity to be flexible over time with many types of projects to explore. The work of the students in the department of landscape architecture at Mississippi State University has developed an empathy for communities that do not have the resources to develop plans or need leadership to help shape the direction of the community. The issues surrounding food in Mississippi are ongoing. Students were asked to inventory and analyze conditions of multiple sites in multiple rural communities to assess possible sites for community markets and shared public spaces. From these early studies, students went through the design process to develop strategies for communities to develop sites and provide marketing drawings. The sites provided allowed for students to explore the interconnectivity between place and cultural context and the issues of food deserts and other design issues related to food such as land planning. From the educator and administrative points of view the projects were highly successful as the students participated in hands on learning with real clients. Positive feedback was given from the communities with one community’s Chamber of Commerce giving the team a Community Service Award for the work completed. Student feedback was positive as well with students giving written testament to how proud they were of the work they completed and how they felt it was important to have real world projects with real clients giving feedback. While money and resources can be an issue when utilizing service-learning in the classroom, there is always a way to find help in these arenas. We weren’t afraid to ask what we could do in the community to find accommodations or meals, spreading the word of what we were trying to accomplish.

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A PRODUCTIVE PERMACULTURE CAMPUS IN THE DESERT. VISIONS FOR QATAR UNIVERSITY

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Keywords): Productive Landscapes, Edible Campus, Urban Permaculture, Urban Oasis, Drylands

Abstract: In Qatar food and water security are high on the agenda of safe and sustainable development. At the same time, rapid urbanisation which is not integrated with ecological landscape design is contributing urban sprawl, fragmented landscapes and to the loss of biodiversity. At Qatar University, the architecture department has been working for several years on the concept of regenerative cities to develop an integrated approach to planning and design and to increase resource efficiency and quality of life. This has led to research and projects on edible landscapes at the campus to contribute to food supply to the University, while at the same time promoting biodiversity on the campus. Using examples from Edible Campuses worldwide, as well as literature on Permaculture, Food Urbanism and Edible landscapes, students and faculty identified strategies and best practices for implementing this vision for Qatar University. An analysis of the campus and existing and future buildings and landscapes was undertaken, to identify the types of interventions – retrofitting of existing buildings with green roofs and green walls and biodiversity habitats, transformation of existing landscapes, use of empty lands for food production, and modification of the urban design of future buildings with integrated food gardens. The Permaculture approach includes the concept of systems thinking and maximum resource efficiency and is used as the philosophy and framework for all the interventions proposed. This includes water recycling and treatment, organic waste recycling, clean and renewable energy producing. The project also includes awareness campaigns, citizen participation and the collection of quantitative data on the concept of Food Miles,that is the amount of miles food travels until it reaches our plate.

1. Introduction

Qatar imports over 90% of its food and obtains 99% of fresh water from desalination. This implies that food and water security are high on the agenda of sustainable development. Organic waste is not recycled systematically at a large or individual scale, resulting in wasted resources. Rapid urbanisation which is not integrated with ecological landscape design is contributing to the loss of biodiversity. As University Campuses worldwide are striving to become more sustainable and resource efficient, some are beginning to also develop the concept of the Edible Campus, which includes implementing spaces to grow food within the University Grounds. These initiatives are first and foremost to provide the users with healthy and sustainable food, but also to educate the University population about the production of food and the resources involved. Producing food on a campus not only reduces the food print, that is the energy that is required to bring the food from distant fields to the plate, but also allows more efficient resource use and recycling, for example the recycling of organic waste as compost and the use of grey water in irrigation. Dormant lands – green fields – can be used to produce crops, and decorative landscapes can be converted into productive landscapes with food and medicinal plants. Edible boulevards are constructed with fruit bearing trees, and can still have urban and climatic functions of providing shade. A permaculture approach to food production can also contribute to increasing biodiversity on the campus, with careful combinations of plants that repel harmful insects but attracts multiple species. (Grichting & Awwad, 2015)

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1.1 Research Questions

Universities, being key institutions in processes of social change and development, play explicit role in spreading knowledge and producing highly skilled personnel to meet perceived economic needs (Brennan, King, and Lebeau, 2004). This role helps in encouraging and facilitating new social and cultural values supported by the students who assume the major change of their societies. That is why, the issue of food and water security can be addressed though universities, with the aim to encourage students to grow their food in campus. At Qatar University, the architecture department has been working for several years on researching and implementing edible landscapes in the campus to contribute to food supply to the University, which at the same time promoting biodiversity on the campus. This research looks at how can the concept of Edible Campus can be applied in Qatar and the Gulf Region, in a dry land climate? How does this project relate to other Master Plans for University Campus' and initiatives for Edible Campus Designs and Master Plans worldwide ? What is Urban Permaculture and how can it contribute to a Sustainable Campus and City? This research looks at the different practices and modes of producing food in dry lands and proposes an application at Qatar University campus. It builds on previous research on Food Urbanism in Doha, and on a prototype Edible Boulevard and Edible Rooftop Garden being implemented at the College of Engineering.

1.2 Purpose

The purpose of this work and research is to create an overall vision of an edible and biodiverse campus in the form of a Master Plan, as well as to implement experimental permaculture gardens on the campus This paper presents the work with students to envision an overall master plan for the campus.
As architects and planners of urban landscapes, we hold a vital tool in the growth of a sustainable community. Food is both a local and global issue. The lack of productive urban land, food insecurity, uncontrolled urban growth, and a general lack of societal knowledge of food growing and preparation are the main drivers to conduct this research and implement its prototype at Qatar University campus.

2. Approach and Methods

This research was carried out as part of an undergraduate course in Urban Planning and Design, building on the student work of the previous year and also projects produced by graduate students in Urban Planning and Design. The work also integrates projects and research carried out on an Edible Garden at the Female College of Engineering and workshops and exhibitions on Landscapes for Food Security Biodiversity and a student workshop on Green Roofs held in the department design studios.

2.1 Approach to the Research

An analysis of the campus and existing and future buildings and landscapes was undertaken, to identify the types of interventions – retrofitting of existing buildings with green roofs and green walls and biodiversity habitats, transformation of existing landscapes, use of empty lands for food production, and modification of the urban design of future buildings with integrated food gardens. The Permaculture approach includes the concept of systems thinking and maximum resource efficiency and is used as the philosophy and framework for all the interventions proposed.

The Permaculture approach was introduced to the students as an efficient way to address the questions of growing healthy food with scarce resources at the same time promoting biodiversity. Permaculture is a sustainable and a conscious approach to agriculture, and a creative design system based on ecology for designing integrated systems of food production, housing appropriate technology and community development. Permanent agriculture offers many solutions for the problems of dimensioning resources in a campus or in a city. It providse space with shelters, food and water, income, community and aesthetic and spiritual fulfillment, and other material and non-material needs in a sustainable way. It works with (not against) nature, so, permaculture can be more concern about the neglected parts in cities and campuses. Permaculture contributes in making them sustainable by providing them with clean and safe air and water, clean and renewable energy, healthy biodiversity, healthy and accessible food, and an access by proximity.

From the previous research undertaken by students and faculty on Food Urbanism in Qatar (Grichting, Ball, Awwaad, 2014), and in particular the study of Paige Tantillo's permaculture laboratory garden, we can confirm that permaculture can and is being implemented in Qatar, and can have significant benefits to both food security and biodiversity, as well as consuming less scarce resources (water, soil) and recycling organic waste and water. We can make the following assumptions:

- Permaculture techniques can help increase food security in Qatar
- The implementation of Permaculture practices helps to increase and benefit soil structure by use of compost, manure, straw, diversity of plants
- Natural pest management practices can be used instead of harsh chemicals
- Bio- diversity can be increased with a mix of vegetables, herbs, fruit trees, and beneficial plants – which can also decrease pests and bring beneficial insects to site
- The basic elements of the Permaculture approach are :
    - Soil building (compost and manure)
    - Trees for wind breaks
    - Companion planting
    - Grey water recycling
    - Crop rotation
    - Composting
    - Chickens for soil turning
    - Planting nitrogen-fixing trees
    - Creating a food forest
    - Mulching with straw to decrease water usage and add nutrients to soil
    - Test beds are prepared to ensures a full utilization of the organic wastes

2.2 Methodologies of the Research

Case studies of Edible Campuses worldwide were studied, as well as literature on Permaculture, Food Urbanism and Edible landscapes, to identify strategies and best practices for implementing the plan. The research also looked at systems to maximise resource efficiency, including water recycling and treatment, organic waste recycling, clean and renewable energy producing. The project also includes awareness campaigns, citizen participation and the collection of quantitative data on the concept of Food Miles, that is the amount of miles food travels until it reaches our plate. The aim of the students research was to produce an Edible Campus Master Plan. To achieve this, students worked in groups to address specific components and themes or layers of the Master Plan including

Productive Landscapes in Green Fields, Productive Green Roofs, Transforming Decorative Landscapes into Edible Landscapes, and a Central Park and Biodiversity Reserve. (See Table 1.)

Table 1. Outline of the Framework for the Edible Campus Project

1. Master Plan	• Work on master plan, land use, functions and future scenarios. • Integrating the other projects into one vision and master plan. • Look at the overall network of green and productive spaces created by the Food Urbanism Master Plan. • Study other Master Plans for Edible Campus' worldwide.	
2. Productive landscapes in green field.	• How to use and propose planting food in the undeveloped land within the University campus. • Can be temporary – for sites with future projects, or permanent. • Can include greenhouses or open crop as well as livestock and fruit trees, dates, etc.	
3. **Productive Green roofs.**	• Mapping the potential for Green Roofs at Qatar University. • Identifying different Land Uses – Crops – for the roofs. • Explaining the systems – Water recycling, organic waste recycling, etc	
4. **Transforming Decorative Landscapes into Edible Landscapes.**	• Divide the campus into sectors and work on transforming Existing Landscapes into • Edible Landscapes. See the example of the CENG Edible Garden by the UREP team. • Identify areas and landscapes that can be transformed from decorative landscapes to Edible Landscapes and propose plantings.	
5. **Central Park and Biodiversity Reserve**	• Develop the concept of the Central Park • Develop the Wadi as the backbone of a biodiversity corridor • Connect these Green Spaces as a network of green spaces with the surrounding areas.	

Students were asked to respond to a series of questions in order to verify that they could integrate the concept of the edible permaculture campus into larger idea of sustainable urbanism(s) and food urbanism and also relate it to similar projects worldwide.

- How does this project relate to other Master Plans for University Campus' and initiatives for Edible Campus Designs and Master Plans?
- What is Urban Permaculture and how can it contribute to a Sustainable Campus and City?
- Which types of Urbanisms / Urban Design Principles did you integrate into your design
- Outline the main steps you went through in your research and design process?

3. Results

The result of the research and the student work was a proposal for a Master Plan for an Edible Campus at Qatar University. It is intended as a tool and vision to initiate interdisciplinary and multi-stakeholder involvement in a strategy and plan to promote food production and biodiversity on the campus. It also includes the optimal use of scarce resources such as water and energy, and recycling of waste, in particular organic waste.

The students produced a series of posters and an integrated Master Plan containing all the parts of the projects.

3.1 Master Plan

The first step in our part (The Master Plan) was to have a clear vision and mission for QU edible campus, and relate it to Qatar National Vision 2030. The second step was to analyze the food cycle process and show its aim in addressing local food security. The third step was studying a case - McGill University's School of Architecture, to understand and see what strategies and methods it has implemented to have an edible campus. The result was master plan of Qatar University campus showing the land uses and functions, supported by different types of charts showing the existing and the proposed design for the future.

The last and the most important step was to compile and arrange all the layers of the other students into one master plan to produce the overall vision. The final master plan combines the existing plan in addition to the future plans, covering all types of buildings, roof tops, productive and edible landscapes and the central park.

Figure 1. The Master Plan for the Edible Campus at Qatar University

3.2 Transforming Decorative Landscapes into Edible Landscapes.

The main steps of the design process to transform the existing landscapes at Qatar University into Edible Landscapes are listed below.

- Identifying the areas where the existing landscapes were located:
- Studying the existing landscapes and the surrounding public spaces (if any)
- Studying the existing landscapes and the surrounding buildings and facilities
- Categorizing existing landscapes into similar surrounding facilities (zoning phase 1)
- Generating a strategy that will help identify the types of edible landscape that will be incorporated into the campus
- Identifying the edible landscape typologies from the strategy that will be used for each category of existing landscape (final zoning phase)
- Selecting one area within each typology to be transformed and be used as an example for each typology
- Generating plans, sections and photo montages for each area to visualize the proposal

Figure 1. Transforming Decorative Lansdcapes into Edible Landscapes

3.3 Productive Green roofs

Students started researching about green roofs, how they could be applied on different types of buildings, what systems could be implemented and what types of crops could be grown, or biodiversity encouraged.
The students visited existing buildings on the campus, and also looked at the designs of new buildings to see where Green roofs could be implemented. They then mapped the green roofs that were identified as suitable on the master plan layer, as well as those that were accessible to the public and/or to different users.
The student attended a seminar on Green roofs and biodiversity and learned about different systems for green roofs and how to encourage biodiversity.

Figure 2. Productive Green Roofs

3.4 Productive landscapes in Green Field

The approach for the Green Fields included identifying the reserve land in the University campus that was not yet developed – to proposed temporary agricultural uses that would also create a green infrastructure for the future urban and landscape designs for the campus development.

First, students located the unused and unproductive fields on the master plan of the campus. They also located the new metro station and incorporated it into their design with a building that can grow food inside. So when the people arrive at the station they will have a new kind of experience inside the station where they can select fresh fruits and vegetables to consume.
Subsequently, students started to locate the different typologies of food production into the new gardens and fields (green house, fruits garden, medicinal garden, crop fields, etc.) and categorized the different kinds of fruits and vegetables that can be grown in the different types of structures and landscapes.

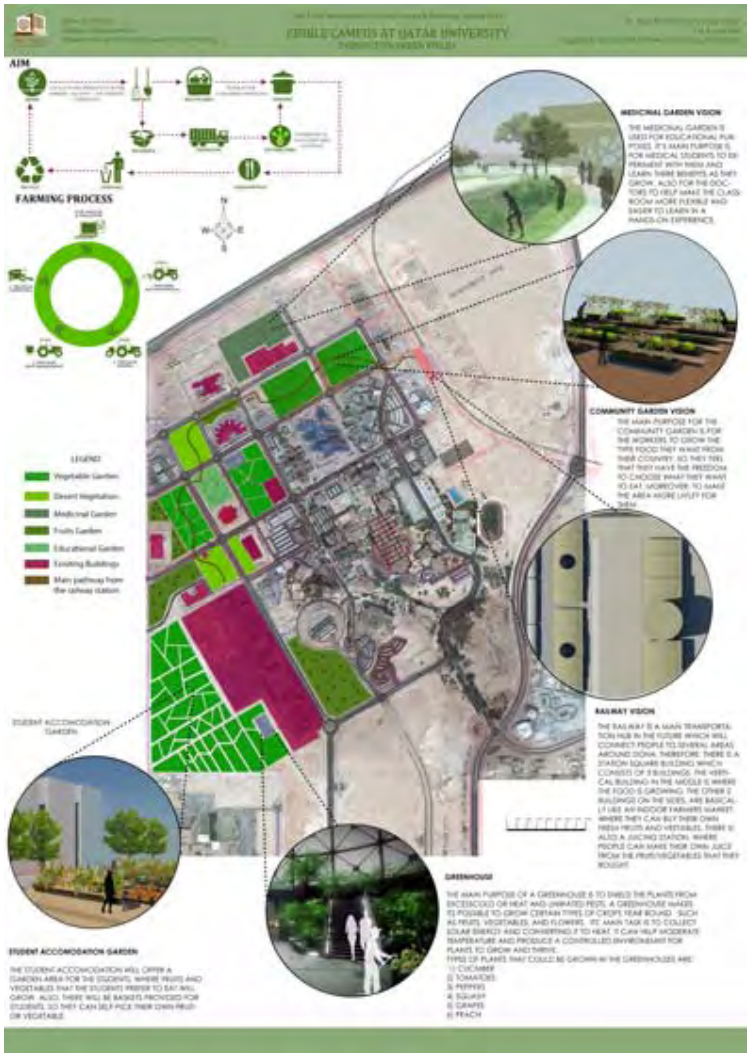

Figure 3. Productive Landscapes in Green Fields

3.5 Central Park and Biodiversity Reserve

The design process focused on the Qatar University central park, where it should be located, and how it could be developed within the framework of edible campus, permaculture and biodiversity. The existing Wadi conservation was chosen as the backbone of a new green network at Qatar University.

The areas surrounding Qatar University were also studied to connect the new green spaces to a larger green network. An important step was to obtain the topographic information for the site, in order to maximize the water efficiency in the landscape. The students worked on the biodiversity of our campus and identified species, including herbs, plants, and birds that are existing.

Figure 4. Eco-Wadi, Central Park and Green Network

4. Conclusions

Edible campus projects are very effective way to show how sustainability, environmental quality and food security and can be linked through a creative design which produces food. In this project, some design strategies are taken from other case studies such McGill University edible campus and Cornell

University edible campus. In case of Qatar University campus, there might be challenging urban and climatic settings. This project successfully shows ways and offers solutions for how to weave productive planting in urban spaces without diminishing their utility or functionality. The master plan of this project can be also a leading step to more future edible campuses in the country and in the region.

It takes into consideration the needs of the campus in terms of food security and biodiversity. In addition to this, it acknowledges the importance of the social and community aspect within the campus. Also, it looks at different ways to integrate edible landscaping in both the existent and the non-existent landscapes. Finally, it uses ways such as permaculture to create a sustainable edible landscape for the campus which will be beneficial not only for the occupants of the campus but also to nature as it follows natural processes.

This research and design project developed with architecture and urban design students shows how they envision the future of their campus - one where the students, faculty and all the workers will be proud of a sustainable and green environment and they will all benefit from it. The green roofs will create a place for informal recreations and provide less crowded, less polluted and less noisy spaces. Therefore, it will increase the interactions in the community and the activities in the campus. Moreover, it will improve the air quality by filtering airborne particles in the leaves and branches.

Through all the case studies students learned many things to apply to apply to their campus and they worked on landscaping the whole master plan to include edible areas, green roofs, a central park, green network connections and biodiversity corridors, as well as social spaces with informative digital hubs to educate the campus users on the systems, foods and species of the campus.

Next steps include brining the vision to the University Presidency and creating an interdisciplinary and inter-departmental group to develop the project and implement it with the Building Services and University Administration. A research grant has been submitted to further the research and project work and the researchers, faculty and students are all convinced that this idea needs to be pursued at Qatar University and in the Gulf Region.

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FARMING AS A TOOL OF URBAN REBIRTH? URBAN AGRICULTURE IN DETROIT 2015: A CASE STUDY

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Keywords: Detroit; case study; urban agriculture; shrinking cities; planning

Abstract: While a very complex urban system of Detroit crumbled and the city shrunk in capital, human resources, businesses and structures, new urban niches have reopened. The most noticeable changes in Detroit's landscape are urban agriculture projects that have been spread all around the countless vacant lots and a new urban morphology and metabolism are emerging. Urban agriculture can be seen as the major driver of change. One would say that transformation into a rural-like agricultural landscape with small urban islands could be the Detroit's future. The paper explores the contemporary urban agriculture scene in Detroit analyzing the range of urban agriculture projects and organizations. Detroit demonstrates the important role of grassroots, NGO's, entrepreneurs and also government planning and policy. The case study reveals the value of urban agriculture in reimagining urban landscapes and food systems of shrinking cities and the importance of a systemic network in this process. This kind of approach could be transferable to the European cities rather than individual projects and strategies that have to be always carefully contextualized.

1. Introduction

"Detroit is the next Detroit" is often quoted by Detroiters when discussing the city's future. Redevelopment of the Motor City is sometimes compared to Silicon Valley or Brooklyn, but people of Detroit see their city as a unique place. Indeed, Detroit is unparalleled in many ways. The city has given to the world the automobile, assembly line, civil rights movement and black power or the rich music cultures ranging from Motown to Electronica. In many ways it could be seen as the pure expression of Corporate America. For most of the twentieth century Detroit was the model for the world of modernism in terms of a belief in technological advances and optimizing profit from speculative capital through industrialized production – economic monoculture of automobile production (Daskalakis, Waldheim, Young, Stalking Detroit. p. 10). While other cities have experienced post-industrial decline, the dramatic scale of transformation of Detroit renders these changes particularly legible. Americans are aware of what Detroit represents and that's why many thought that the destiny of the United States in 2008 was foreshadowed by the massive economic decline of Detroit. But Detroit of 2015 is a different city. It still attracts attention, not for its crime, bankruptcy, ruins or urban prairies, but for new possibilities that have opened after the unprecedented fall.

Many Detroiters feel that Detroit bankruptcy filing in 2013 was actually the best thing that could happen to the city at that moment. "This is actually an opportunity to stop, hit ground zero and start to build from here," says one interviewed person in our study. The change that many feel could be characterized as a change of paradigm in what urban renewal means in case of Detroit. People have started to see more opportunities in all the urban blight that can go many ways - affordable living for students, young people or artists, new artistic scenes created by newcomers or entrepreneurial opportunities and revitalizing local communities through urban agriculture (UA). While there is going

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to be still a lot of negative issues because of great inertia of the economic decline and Detroit will be still the icon of urban decay in the US, the empty urban and cultural space can be filled in again and the city transformed. The question is, in what way Motor City is going to transform.

2. Problem Recognition

The urban agriculture initiatives in Detroit are recognized as the ones most advanced (Viljoen and Bohn 2014) in the North America. However the picture of urban agriculture in Detroit from other places in the World can be a little bit exaggerated by relying only on a view based on media coverage and popular Internet sources like Facebook or Youtube that can European and other urban gardeners use as available reference and inspiration. The perpetuation of images of the ruins of Detroit juxtaposed with urban agriculture as a narrative of resurgence tends obscure the complexity of stakeholders and range of interests and values at play. This paper aims to gather more specific descriptions of activities of major urban agriculture organizations in Detroit as part of Detroit's transformation and missions of four selected organizations active in urban agriculture movement in Detroit and tries to critically answer the question what kind of practice and strategies could be transferable to European cities.

2.1 Research Questions

1. What is the current situation of urban agriculture in Detroit?
2. How is urban farming recognized as relevant strategy for transformation of post-industrial landscapes in Detroit?
3. Is Detroit's urban agriculture model applicable in European context?

2.2 Goals

1. To explore and describe the contemporary urban agriculture scene in Detroit;
2. to assess their activities and related them to each other and city policies;
3. to discuss the present four cases of urban agriculture organizations and discuss applicability of the Detroit UA model in European context.

3. Methodology

This research involves semi-structured interviews with individuals representing selected urban agriculture organizations in Detroit, conversations with Detroit community members, relevant literature and policy documents reviews, site visits and basic spatial analysis to spatially describe the urban agriculture sites and activities. The interviews were conducted over a time span starting first in the summer and fall of 2008, and again during the fall of 2014 and spring of 2015 varying in length from 30 to 60 minutes. We examined in each interview the key statements, important concepts and processes of how the organizations work and developed. Common patterns and themes were identified a cross the individual interviews. Results of the interviews were related to relevant literature and policy documents reviews.
We used publicly accessible Detroit municipality map to show individual urban agriculture sites in a map with adequate relation to each other using a vector editor.

4. Case Study of Major Urban Agriculture Organizations in Detroit

In the following stories we profile several major urban agriculture organizations in Detroit. The stories focus on development of these organizations and their activities, programs and missions in Detroit, as well as the level of collaboration with other organizations, communities and municipality. We introduce and describe Greening of Detroit, Earthworks, Detroit Black Community Food Security Network and Michigan Urban Farming Initiative. The information sources are our own interviews with organizations representatives, personal site visits, conversations and official websites.

4.1 Greening of Detroit

Greening of Detroit (*GoD*) started twenty-five years ago in 1989 for the purpose to plant trees to replace those lost to Dutch elm disease which killed half a million trees in Detroit area during the second half of the 20th century. The organization planted 85,000 trees since then. *GoD* is a nonprofit resource agency with board of directors and 25 fulltime employees. From this perspective, it is the largest investigated urban agriculture organization in Detroit. Experts like landscape architects, foresters or professionals with degree in environmental sciences are employed there. The mission of the organization is to build a sustainable community through planting trees, creating green spaces, urban agriculture and jobs. The organization expanded its scope and began to incorporated urban agriculture activities and programs after 2003 when the city's "farm a-lot" program ended. At that time *GoD* had "never planted a vegetable", but there was no other group with the capacity or mission to develop a comprehensive urban agriculture program (Atkinson, 2008) the *Detroit Agriculture Network* (*DAN*) had no infrastructure to support a coordinated UA program and *Michigan State University* had not developed capacity to work with neighborhoods. In the first year of what became the *Garden Resources Program, GoD* worked with 42 families and 39 community and school gardens (Atkinson, 2008).

4.1.1 Programs and Activities

The *GoD* has currently four main programs: the *Garden Resource program*, *Build a Garden program* and *Urban Agriculture Adult Apprenticeship program* as well as several other activities as part of other partnerships. The *Garden Resource Program* once supported the majority of gardens in Detroit (over 1500), providing seeds, soil testing, transplants, organization and training classes. However, they do not participate in this anymore. The reason why they stopped doing this was because some of the people who worked in urban agriculture department of the organization spun off and started their own organizations and *GoD* did not want to compete with these other organizations and therefore *GoD* focused on other activities and services, school programs, nutrition education, and market gardening as described further.

The current organization's activities include job training such as *Landscape technician program* for Detroiters who are unemployed or have social barriers to get an employment. Next is *Build a Garden* program, where they support Detroit residents to set up an urban garden. *GoD* helps to deliver highly subsidized raised beds, their own compost and instructions how to garden. Through this program they have supported 63 new urban gardens. *GoD* has also partnership program *Urban Agriculture Adult Apprenticeship program* for teaching people how to run small production farm. The organization also cooperates with local schools. In 2014 they built six school gardens along with outdoor classrooms, a nutrition education curriculum, and the gardening curriculum.

Another program is *Green Corps Youth Employment program* mainly for managing trees planted in prior years by *GoD*. *GoD* hires between 80-200 Detroit's high school students to help with watering the trees planted during the summer. The students also help to maintain greenways in parks and are taught about urban agriculture as well. Therefore the seasonal staff can grow up to several hundred people, although most of this work force is composted from volunteers.
Vacant lot treatments is another important activity, when the organization works with local community groups on various strategies for revitalizing abandoned lots (e.g. trees, community garden, park or pocket park). This treatment program was also the original reason for the organization getting into job training.
The goal of all these programs is to teach people how to grow food, eat healthy, and support their families and neighborhoods as well as their own partial self-sufficiency. Other activities include educational workshops on the three farm gardens that are owned and managed by the organization itself.

4.1.2 Farm Sites

The *Market Garden* is one-hectare urban garden founded on a former industrial site on Orleans St. in a vicinity of the Detroit's *Eastern Market*. This garden has a fulltime farm manager and also works as demonstration site for training programs, classes and workshops. The produce from the Market Garden is primarily sold through *GoD's* Community supported Agriculture program.

Figure 1. Market Garden. Photo Jan Richtr.

Lafayette Greens community Garden on 132 W Lafayette Blvd is the only urban agriculture project in Detroit located in the downtown area. Prior to the garden an abandoned art-deco building existed on the site, which was torn down in 2010. Kenneth Weikal Landscape Architecture firm designed in 2012 the garden for the *Compuware Corporation,* which ran the community garden for 2 years and then donated the project to *Greening of Detroit* in March 2014, although the City of Detroit owns the land. The garden has an onsite coordinator employed by *GoD* and volunteers help maintain the space. All production from this garden is donated to food banks and other social enterprises. Part of the production is given to the volunteers themselves. Because the site is open to the public during the daytime from March until October, the priority is put on aesthetics, rather than education and production. Due to this reason the garden does not have a compost operation on site and ornamental flowers are grown together with herbs, vegetables and fruits. The garden was also part of a research on pollinators in urban areas conducted by the *University of Michigan* in 2014. The garden hosts various artistic, cultural, social and wellness events throughout the season.
Romanowski Park is located in southwest Detroit and has a farm garden in its center managed also by *GoD*. The orchard, berry shrubs and vegetable plots are in open space. The organization cooperated with local school on this garden in the past, but the school was closed recently and local

community involvement is not as good as the organization would like, so they are in an interim phase now trying to figure out what direction this garden will take.

Figure 2. Lafayette Greens community Garden. Photo Jan Richtr.

Figure 3. Public garden and orchard in Romanowski Park. Photo Jan Richtr.

4.1.3 Food production

The produce from *GoD* gardens is not sold at the Eastern Market like in case of other UA farmers, but through different channels to not compete with small farmers .

4.1.4 Financing

GoD is financed mostly by foundations, state grants, corporate funding and small donations with an annual budged just under 4 million USD. Part of those finances is also received by small contracts for services. They are trying to appeal to local citizens to contribute small donations with the goal to get more Detroiters involved. According to the interview, funding is still the biggest issue, because demand for activities and services is higher than their financial capabilities.
GoD also contracts some services. For instance tree planting for Detroit Water and Sewage services within projects to decrease negative impact of storm waters on sewers.

4.1.5 Relationships with Other Entities in the City

The organization is trying to build various relationships with the city and district managers. They have a community engagement team, which is specifically tasked to build those relationships. Currently

the organization is also looking for opportunities to partner with other teams around the *Detroit Future City* framework, as well as build other relationships on the city level. GoD has a seat on food policy council or *Green task force*.

4.2 Detroit Black Community Food Security Network and D-Town Farm

Detroit Black Community Food Security Network (DBCFSN) was established in 2006 to address issues with food quality, availability and security especially for Detroit's African American community, while realizing that better local food system can benefit to all Detroit residents.
Another significant reason for the formation of *DBCFSN* was a perceived disproportion between urban agriculture endeavors run by mostly white citizens and majority of African Americans in Detroit community.
"We observed that many of the key players in the local urban agriculture movement were young whites, who while well-intentioned, never-the-less, exerted a degree of control inordinate to their numbers in Detroit’s population. Many of those individuals moved to Detroit from other places specifically to engage in agricultural or other food security work. It was and is our view that the most effective movements grow organically from the people whom they are designed to serve. Representatives of Detroit’s majority African American population must be in the leadership of efforts to foster food justice and food security in Detroit." (detroitblackfoodsecurity.org)
DBCFSN is primarily focused on creating project towards to community self-sufficiency and healthy food awareness. The organization is oriented especially to urban agriculture, policy development and co-operative buying.

4.2.1 Farm Sites

DBCFSN currently runs one production site, but had several more in the past that had to be discontinued due to other intended use by the property owners. In 2008 DBCFSN acquired 0,8-hectare site in the City of Detroit’s Meyers’ Tree Nursery in Rouge Park for its D-Town Farm. Farm is the largest *DBCFSN* operation so far established. *DBCFSN* leases the property for one dollar annually for ten years from the City of Detroit. The farm has several hoop houses, in ground vegetable plots, composting site and apple orchard. Since 2008, they acquired an additional 2 hectares. It is currently probably the largest single farm site for urban agriculture in Detroit. The farm has one fulltime employee, five part-time farmers and around ten internships annually.
The farm produces various vegetables and the food production is connected with extensive compost operation. They compost also materials like expired foodstuff from local supermarket or *Forgotten Harvest* - an organization focused on collecting unused food and food waste have been added. Also, several members of the *DBCFSN* bring in kitchen waste and other household organic material. Avalon bakery from Detroit and one other restaurant used to bring food scraps and coffee grounds in the past as well. Even though they still use city water supply to irrigate drops, the farm is moving toward more self-sufficiency and an irrigation pond and small solar project is being constructed this year.

4.2.2 Programs and Activities

DBCFSN has a youth program called *Food Warriors Youth Development Program* and they have location in various schools in Detroit. *Summer Urban Agriculture Internship Program* helps to bring

interns on farm. They also have *Volunteer incentive program*, where people volunteer in exchange for so-called *D-Town dollars* that can be used to purchase produce from the farm.
Amongst other activities belong *Annual Harvest Festival*, *What's for Dinner? Lecture Series* they also organize a co-op called *Ujamaa Food Buying Club* (detroitblackfoodsecurity.org).

4.2.3 Financing

DBCFSN and its farm are financed through several grants and donations. The major grant is a three-year grant from the *W.K. Kellogg Foundation* with amount of 750 000 USD. They also have smaller grants and donations for farming tools and structures. Selling produce at local farmers markets and *Eastern Market* also contributes a small amount of income to the farm.

4.2.4 Relationships with Other Entities in the City

Relationships with the neighborhood around the farm are not on the level that would be considered by *DBCFSN* as satisfactory, although the community's knowledge of the farm is increasing.
The *Greening of Detroit* resource organization manages the area around *D-Town farm* as tree nursery and they share with them some resources on site. *D-Town farm* also collaborates with *Keep growing Detroit* on workshops, community training activities and moving produce.
Due to *DBCFSN* advocacy for creating Food security policy, the organization was appointed to develop this policy for the city of Detroit in 2006. They had been working on the policy draft also in collaboration with professor Kami Pothukuchi from *Wayne State University*. The city council passed the resolution adopting this policy in March 2008. *DBCFSN* worked further with members of city council and in October 2008 the City Council passed the resolution on the development of *Detroit Food Policy Council*.

4.3 Earthworks Urban Farm

Earthworks urban farm (Earthworks) is one of the most well-established urban agriculture projects in Detroit located on 1264 Meldrum St. It is an integral part of the *Capuchin's Soup Kitchen* since 1998. The soup kitchen has been in operation since 1929 as a part of the *Capuchin order* monastery across the street from the farm. *Capuchins* traditionally work with people in need including youth, therefore *Earthworks* continues in this mission and works with local community and the neighborhood and address issues related to the lack of full service grocery stores in the neighborhood.

4.3.1 Programs and Activities

Earthworks has 6 fulltime employees. Two of them do youth programming five days a week. They teach environmental awareness, growing food and healthy nutrition and cooking. One employee works on outreach and another person runs adult programming. Earthworks also has a lot of university students who can have practice at the farm. They also cooperate with journalist and researchers. Next is *Adult program* - people work four days a week to get experience and learn farm skills for their own UA projects. This program is also used for people who need to do community service ordered by a court. Earthworks also run a 9 month more intensive UA program that is much more intensive. People in the program work 24 hours a week starting at the beginning of the season

until its end. They leave the program with a certification that says they have safe food handling practices, so if they will want to work in a restaurant, food processing facility or food whole selling.
Earthworks also has a market stand on site and people from the neighborhood can access fresh fruits and vegetables. Their prices are set very low and residents can use electronic benefits card (*EBT*) to acquire produce from the farm. This card works like a normal credit card, but provides public benefits to qualified individual below a certain income threshold. Other public program called WIC is mostly for the needs of women and their young children.

Figure 4. Public garden and orchard in Romanowski Park. Photo Jan Richtr.

4.3.2 Food Production

Earthworks has about one-hectare of land dedicated to food production. The plots are spread out throughout the neighborhood within 2 block of the *soup kitchen*. Around 95% of the produce goes into the soup kitchen itself. They also send food home with volunteers who help at the farm.
They use one heated greenhouse especially for transplant production at the beginning of the season. They also have one unheated greenhouse used for growing produce in ground. They use their own compost from all available organic material from the city and food waste from the *soup kitchen*.
It is also one of few farming sites in Detroit, where they have substantial infrastructure for rainwater harvesting. The greenhouses have gutters for rainwater collection and several water tanks equipped with pumps and irrigation systems. However most of the irrigation water still comes from the city water supply.
Interestingly, Earthworks is organic certified that is quite unusual for UA operation in the US.

4.3.3 Financing

Earthworks is organized under the *Capuchin's Soup Kitchen* and creates relatively small part of their budget. Like some other UA organizations they sell produce under the retail price, therefore it makes very small part of their income. They receive private and corporate donations as well and apply for grants especially for acquiring new equipment and structures.

4.3.4 Relationships With Other Entities

Earthworks as a contracted grower grows transplants for *Keep Growing Detroit* who distributes them to thousands of backyard and community gardeners in the city. Compared to other organizations that farm on leased land, Earthworks own the land where the greenhouses are located. Other land for production is used in partnership with other organizations.

In the future, they want to use their capacities and non-profit status for small infrastructural projects like community greenhouse or cold storage and cellars for small local growers.

4.4 Michigan Urban Farming Initiative

Michigan Urban Farming Initiative (*MUFI*) on 7432 Brush St. is a non-profit organization established in 2011 by several students, who moved to Detroit. *MUFI* is run only by volunteers with a core team of 10 young, mostly white and educated people. They grew food on 0,8-hectare in 2014 and describe *MUFI* as "a very comprehensive organization" that focuses mainly on innovations in urban infrastructure through research supported onsite projects.

4.4.1 Current Activities and Planned Projects

The mission is primarily to "challenge assumptions held about how blight and urban infrastructure can be used". Therefore they create cost comparative models for blight deconstruction and scalable models for blue and green infrastructure as part of various research projects. These projects are based primarily around new uses of abandoned properties that MUFI purchases in *Wayne County Tax Auctions* or from *Detroit Land Bank Authority*. The first purchased building is being reconstructed into a future community resource centre with a multipurpose space including a commercial kitchen for educational programming such as agricultural skills, nutritional literacy, and food preparation. Another abandoned house is going to be reconstructed into farm internship housing. Another purchased structure is planned to be a place for a veteran cooperative housing program. They are deconstructing one of the structures down to the foundations for a shipping container type of housing. Another project is creation of a retention pond from an uncovered basement by installing a water resistant membrane. All this with the goal to research and prove a concept of functional use of the urban infrastructure for less than the City of Detroit is currently spending on turning it into the vacant land by demolition, which is relatively expensive (around 15,000 USD according to the interviewed individual). They are also working on projects to develop a pocket vineyard and a farm to table restaurant.
MUFI's activities related to social justice issues and social inequality in the food system are organized especially through selling produce in local community for prices under retail value and through food donations.

4.4.2 Food Production

The first year of *MUFI* operation was oriented almost exclusively to site clean-up, landscaping work and "building presence in the neighbourhood". Food production on site followed in the second year, when MUFI produced 12,000 pounds of food. *MUFI* distributes its production to four main ways. First, there are individual households purchases where people come to the site, harvest with *MUFI* volunteers who weight the harvested produce and suggest donation based on their market guide. The second path of their produce goes to local markets like *Oakland avenue farmers market*, *Wayne state farmers market* and *Eastern Market*. The last channel for their produce are grocery stores and restaurants. The unsold remainders of production goes as donation to *Coalition on Temporary Shelter* and *Forgotten Harvest*.

Figure 5. Michigan Urban Farming Initiative farm site. Photo Jan Richtr.

4.4.3 Resourcing

Selling produce is not the main financial source. The main financing are research grants that acquire data from *MUFI*'s projects, but 90% of the total budget comes from winning social media contests. "*Corporations used to have these community grant things that you apply for and then they've realized they will get more publicity if they open it up to any non-profit and make then compete against each other in a public voting on social media and as organization run by people around 20+ we have a lot of Facebook leverage,"* describes MUFI representative and explains another reason for specific way of funding: *"The grant industry is really difficult to break into. You need to be a veteran non-profit with a demonstrated history of success. ... It is fairly a political process and if the leadership is half young white people, nobody wants to fund that in Detroit."* Other donations include for instance a greenhouse from *National Resource Conservation Service*.

They were able to have 4 500 volunteers working on the site since its establishment in 2011, with over 50 000 volunteer hours. Those volunteers were equally from the Detroit community and southeast parts of Michigan area. "W*e are also, in a sense, acting as a platform to get people from around into the city often under the pretence of saving Detroit through volunteering, but it gets them in the door and what turns out to be the case is, they end up loving and buying property and moving into the city."*

5. Spatial Analysis

We have located major urban agriculture sites within the Detroit city borders and related them to the main urban typology of the city. It is important to point out there are substantially more smaller urban agriculture sites in Detroit that are not projected on the map. The total number of backyard gardens, school gardens, small farms and community gardens in Detroit is estimated to be over 1500 (Economic Analysis of Detroit's Food System, 2014; Greening of Detroit - interview).

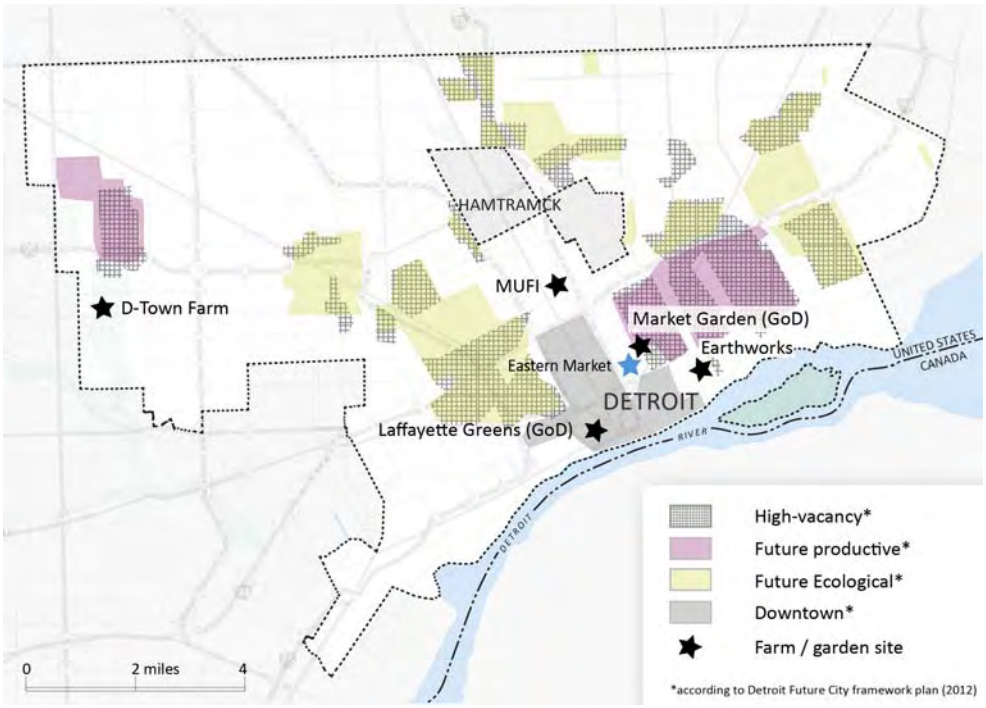

Figure 6. Map of the urban agriculture sites presented in the paper in relation to downtown, high-vacancy areas and proposed productive and ecological areas by Detroit Future City (2012).

6. Discussion

The presented cases of UA organizations, their missions, programs, other activities and sets of issues show extensive and complex UA scene in Detroit. First we summarize and further discuss five characteristics we have identified as most relevant for Detroit case study and also discussed them in context of European Urban Agriculture.

6.1 Detroit as Unique Laboratory of Urban Agriculture

Detroit's 103 square kilometers of vacant land, extensive historical footprint of automotive industry, profound social inequality and the largest municipality with bankruptcy filing in the US history makes from this city a truly extraordinary place. It highlights two things that we consider if Detroit is going to be used as a model city for urban agriculture efforts in other parts of the world. Firstly, as other authors pointed out (e.g. Viljoen and Bohn 2014), this extreme urban environment provides countless places, opportunities and diverse social environments to develop and test new models of urban agriculture. This aspect makes Detroit one of the few places in the world, where urban agriculture can become a significant tool for city transformation. The second important aspect is the scale of this transformation. If the City of Detroit is going to redevelop according to the *Detroit Future City* strategic framework plan, a groundbreaking UA policy will need to be adopted. Such policy will require careful adaptation in different urban environments because of different social and urban assets.

The asset of a great amount of vacant land also influences the character of UA typologies of Detroit gardens and farms. As the UA cases show, vertical types of food production are not present in Detroit. Detroit does not grow vertically. There are no rooftop farms, vertical farming or farming

integrated into buildings as in case of several projects in New York City, Toronto or Chicago. The vastness of vacant land has also determined the way in which urban farming is established within the legal framework of property rights. Many Detroit gardens are located on land without tackling the legal relationship with the plots under the gardens due to massive disorder in ownership of Detroit's vacant lots. This results in a situation that would be generally different in dense urban areas of European cities with relative scarcity of available land.

6.2 Diversity of Endeavours, Cooperation and Competition

Continuous growth in size and number of UA endeavors in the City of Detroit in combination with current population of six hundred thousands people can create a "tension" or competition amongst the individual organizations. As one interviewed person said "*There is a lot of competition in the urban agriculture space here ... People tend to collaborate, but they also tend to compete*." The gradual development of the individual endeavors in the last couple of years has created diversity and new partnerships for cooperation, but also leads to competition over resources and ideas on how urban agriculture in Detroit should look like. By resources we mean especially financial resources in particular, in the form of grants and donations. This kind of resource is fairly limited and organizations have to compete to get it. Other resources like available land and workforce are practically limitless in Detroit. Natural resources and other physical elements can be relatively easily accessible through the systemic network of resource organizations. The major UA organizations actively cooperate in terms of participation on creating food system and food security policies in Detroit and bring into the process priceless experiences and knowledge. Therefore, Detroit provides great example of coordinating the diversity of these efforts and accepting the differences, although it could be said that there is still present a political realm connected to social inequalities and race issues (see next chapter), and missions or practices of UA endeavors are perceived by some through these lens. We can assume that the number of UA endeavors is going to further increase due to more agriculture friendly policies in Detroit and those will need to search for new financial resources and market niches.
The lesson that could be learned from this for UA projects in Europe is that the value of networking and creating partnerships in urban environment is highly beneficial and most probably also a successful long-term strategy and that such partnerships and cooperation can overcome political differences as we can seen in Detroit, where these "tensions" are still present, but do not limit the beneficial cooperation amongst most of the endeavors.

6.3 Social Justice and Race Issues

Due to history of social disparities amongst the white and black population in Detroit and the fight for social justice by the African American community, these issues are also an integral part of the UA scene in Detroit. That is also the central narrative of *DBCFSN*, which addresses these issues through urban agriculture, food related education and increasing self-sufficiency of particularly black communities. Therefore land cultivation and food production has become a tool to work with these issues.
Such socially oriented grass-roots movements creates a counterweight for endeavours that seek different goals while using urban agriculture as a mean how to achieved such goals. The classical example in Detroit is *Hantz Farm* project, which applies a capitalistic approach in urban agriculture. Hantz Farm stated strategy is to use urban agriculture as a means to create scarcity of real estate, which will increase land values. Meanwhile the vacant land that was acquired at a low rate will be

used for timber production by creating forested areas. Although we did not include Hantz Farm project in our case study, there are other authors who describes some concerns shared by local communities about this project (Giorda 2012; Viljoen and Bohn, 2014, Cohen 2014).
This provides a cautionary narrative about the disparities in political and economic power and how can they impact land tenure and social justice values of urban agriculture.
Giorda (2012) identified two basic narratives for UA in the Detroit's future development. The first one is based on very strong social movement dated back to the 1960s, when Detroit's black community started to fight for its rights and against the city that was building its "apple with a hollow core" on exploitation of African Americans. "As many Detroit gardeners are the heirs of the activists who fought in the past for social justice and equal rights, their quest for locally produced food is informed by the concept of food justice" (Giorda, 2012). The second narrative is the capitalistic one. The Detroit's tradition of entrepreneurial spirit and use of technologies along with "big money" creates a conflict with the food justice approach as in case of *Hantz farms,* and partly also in the case of *Michigan Urban Farming Initiative*, where the historical perspective of racial issues in Detroit is exposed. It is still not clear yet, which one of these two narratives will prevail in following Detroit transformation.
The historical and social framework, as well as those two competing approaches in UA are not so familiar and hard to recognize from the European perspective. We could say Detroit is still perceived here as the city in unprecedented decline, and because of the lack of knowledge about more fine scale relationships between individual organizations and UA projects, the picture of urban agriculture in Detroit can be easily fetishized, especially if seen on the stage with such fascinating scenery of industrial ruins.

6.4 Addressing Educational, Economic and Environmental Aspects of Urban Agriculture

All of the organizations presented have programing for youth and adult education (*MUFI* is constructing community resource centre also for education programing). The education of Detroiters in farming techniques and creating knowledge and skills about urban agriculture is an integral part of UA in Detroit.
The financial feasibility of UA endeavours in Detroit is strongly supported by the work of volunteers. Some of the events like tree planting or site clean-ups were attended by hundreds of volunteers. Many of described endeavours could not be possible without unpaid hard work of those individuals.
Another interesting fact is that selling produce does not create substantial income for the investigated organizations.
Environmental aspects are evident, especially in the form of self-reliance of urban communities, which is, again, connected to social issues and strengthening independence on capitalistic agro-food system. We have also found that the term "climate change" is not present in the Detroit's UA narrative. We think that it is because UA endeavours deal with a more immediate set of locally based, and more pressing environmental and social issues in Detroit. We also argue that it is the main difference between Detroit's narrative of urban agriculture and narrative that we can find in contrast to Europe.
In the European context sustainable development managing climate change, short supply chains and food security are one of the key arguments for current Urban Agriculture efforts (e.g. COST UAE - www.urbanagricultureeurope.la.rwth-aachen.de).

6.5 Missing Progressive Policy for Urban Agriculture in Detroit

The history of urban agriculture in Detroit dates back to the late 19th Century, when Mayor Hanzen Pingree sponsored potato patches for Detroiters to overcome the economic crisis and to Liberty and Victory gardens in World War I and II (Giorda 2012) as well as to vegetable backyard gardens of African Americans who came to Detroit after the war to work in the auto industries (Treuhaft et al. 2009). All the UA organizations studied here have been in Detroit long before the recent bankruptcy filling, and UA present in Detroit today has been slowly gaining momentum at least for the last ten years. Because most of the literature sources and studies are dated prior the bankruptcy filing, we have tried to outline and discuss more tangible changes that came after this event. For most of this time, UA, as a legitimate land use, was not recognized by the City of Detroit in zoning codes. It changed in April 2013 when the City of Detroit passed the code for urban agriculture, but still prohibits all farm animals (Cohen 2014) including bees.

Detroit Future City (*DFC*) strategic framework is a multi-year comprehensive planning process that resulted in long-range plan to articulate a vision for the future of Detroit's urban realm (Cohen 2014). The way *DFC* incorporates urban agriculture into the future redefinition of Detroit land use is unprecedented and unique due to the size of areas that are proposed to be transformed into rural like productive and innovative landscapes accommodating diverse types of farming practices such as urban forests, aquaculture facilities and testing plots of innovative farming practices (Detroit Future City 2012). Although, today none of the presented farm sites studies here are located in one of the areas with the highest vacancy (see figure 6). A substantial program for large-scale urban agriculture will be required to transform these rural-like spaces and introduce urban agriculture into these areas.

Urban agriculture as a legitimate and even important part of Detroit renewal is also a political issue, and UA organizations in Detroit play a key role in adopting the UA policy. The combined efforts with other UA organizations is one of the few things that European counterparts should pay attention to, because these strategies for cooperating and communicating together are more transferable than the particular goals and missions of the individual urban agriculture organizations in Detroit.

7. Conclusions

The case study reveals the large diversity of projects, actors and approaches that are linked into a networked system that coordinates various resources across multiple sites and scales. The case study reveals the value of urban agriculture in reimagining urban landscapes and food systems of shrinking cities and the importance of a systemic network in this process. This kind of systemic approach could be transferable to the European cities rather than individual projects and strategies that have to be always carefully contextualized. Urban agriculture in Detroit is not yet a fully sustainable enterprise from the economic point of view, but the UA activities have their values in other metrics.

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