Building a Modern Agricultural Planting Garden in an Urban Area, Restoration of Shenzhen Central Park, Guangdong, China

Yan Xu
University of Massachusetts - Amherst

Follow this and additional works at: https://scholarworks.umass.edu/larp_ms_projects

Part of the Landscape Architecture Commons

Xu, Yan, "Building a Modern Agricultural Planting Garden in an Urban Area, Restoration of Shenzhen Central Park, Guangdong, China" (2014). Landscape Architecture & Regional Planning Masters Projects. 65.
Retrieved from https://scholarworks.umass.edu/larp_ms_projects/65

This Article is brought to you for free and open access by the Landscape Architecture & Regional Planning at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Landscape Architecture & Regional Planning Masters Projects by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.
Building a modern agricultural planting garden in an urban area, Restoration of Shenzhen Central Park, Guangdong, China

Masters Project

Yan Xu
Masters of Landscape Architecture
University of Massachusetts, Amherst

Spring 2014

Approved as to style and content by:

____________________________________________
Mark S. Lindhult, Committee Chair
Landscape Architecture and Regional Planning

____________________________________________
Robert L. Ryan, Committee Member
Landscape Architecture and Regional Planning

____________________________________________
Elisabeth M. Hamin, Department Head
Landscape Architecture and Regional Planning
# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** ......................................................................................................................... 1

**ABSTRACT** .................................................................................................................................................. 2

**CHAPTER 1 – PROJECT INTRODUCTION** ................................................................................................. 3

**CHAPTER 2 – LITERATURE REVIEW AND CASE STUDIES** ....................................................................... 4

2.1. Literature Review ........................................................................................................................................ 4
   2.1.1. City and park ...................................................................................................................................... 5
   2.1.2. Park and agriculture .......................................................................................................................... 8
   2.1.3. City and agriculture .......................................................................................................................... 14

2.2. Case Studies ............................................................................................................................................... 17
   2.2.1. New York Central Park ...................................................................................................................... 19
   2.2.2. Farmlands in Lim Chu Kang - Agrotechnology Park in Singapore ..................................................... 21
   2.2.3. New Princess Garden, Berlin urban agriculture Project ....................................................................... 26
   2.2.4. Agricultural planting park in Chengdu, China .................................................................................. 30
   2.2.5. Lafayette Greens urban garden, Detroit, Michigan ......................................................................... 32

**CHAPTER 3 - METHODOLOGY** ................................................................................................................ 34

3.1. Goals and Objectives ............................................................................................................................ 34
CHAPTER 4 – PROJECT BACKGROUND

4.1.1. Introduction of the land

4.1.2. Context and Geographic Character of Shenzhen Central Park
  4.1.2.1. Location
  4.1.2.2. History
  4.1.2.3. Topography
  4.1.2.4. Hydrology
  4.1.2.5. Green space
  4.1.2.6. Land use
  4.1.2.7. Transportation
  4.1.2.8. Park management

4.1.3. Context of focus area in Shenzhen central park
  4.1.3.1 General information
  4.1.3.2 Historic heritage- Lychee forest
  4.1.3.3 Site view
  4.1.3.4 Existing photos presenting various elements on site

4.2. Agricultural planting Garden Design Proposal
  4.2.1. Major Challenges and opportunities in the selected area
  4.2.2. Strategies
4.2.3. Conceptual Plan for Selected Area .............................................................................................................. 64
  4.2.3.1. Prime development area .......................................................................................................................... 64
  4.2.3.2. Urban agricultural ideas applied to the site ............................................................................................. 67

4.2.4. Schematic Plan for Selected Area ................................................................................................................ 69
  4.2.4.1. Master plan of selected area .................................................................................................................... 69
  4.2.4.2 Plan of focus area ...................................................................................................................................... 71
  4.2.4.3. Space use and programs on site ................................................................................................................ 76
  4.2.4.4. Site perspective ..................................................................................................................................... 78

CHAPTER 5 - CONCLUSION ...................................................................................................................................... 81

BIBLIOGRAPHY ..................................................................................................................................................... 83
LIST OF FIGURES

Figure 1 New York Central Park (Image resource: www.centralparknyc.org/) .................................................................21
Figure 2 Lim Chu Kang -Agrotechnology Park in Singapore (Image resource: ) ..............................................................25
Figure 3 New Princess Garden in Berlin (Photo taken by Yan Xu) .................................................................................29
Figure 4 Agricultural planting park in Chengdu (Image resource: http://www.hxhopegroup.com/main) ..........................31
Figure 5 Lafayette Greens urban garden (Image resource: www.asla.org) ........................................................................33
Figure 6 The master plan of Pearl River District regional greenway (Image resource: http://www.gd.gov.cn/tzgd/tzgdzt/ldw/) .38
Figure 7 The master plan of Shenzhen regional greenway (Image resource: http://www.gd.gov.cn/tzgd/tzgdzt/ldw/) ..........38
Figure 8 Shenzhen Central Park in context of China (Image Source: www.baidu.com/image/shenzhencentralpark) ........39
Figure 9 Shenzhen Central Park connected to the regional greenway. (Image created by Yan Xu) ......................................40
Figure 10 Five Parcel in Shenzhen Central Park and the acreage of the area (Image and table created by Yan Xu) ..........41
Figure 11 Features in Parcel A (Photo taken by Yan Xu) ..................................................................................................42
Figure 12 Features in Parcel B (Photo taken by Yan Xu) ..................................................................................................43
Figure 13 Features in Parcel C (Photo taken by Yan Xu) ..................................................................................................44
Figure 14 Features in Parcel D (Photo taken by Yan Xu) ..................................................................................................45
Figure 15 Features in Parcel E (Photo taken by Yan Xu) ..................................................................................................46
Figure 16 Shenzhen central park in 2001 (Image resource: www.baidu.com/image/ shenzhen central park) ..................47
Figure 18 Futian river and waterfront view ( Photos taken by Yan Xu) ............................................................................49
Figure 20 Land use map .....................................................................................................................................................51
Figure 21 Transportation connection in the area and park entrances ............................................................................52
Figure 22 Context of focus area in Shenzhen Central Park (Image created by Yan Xu) .......................................................55
Figure 23 The land use map of the surrounding of focus area (Image created by Yan Xu) ................................................56
Figure 24 Lychee forest view (Photos taken by Yan Xu) ..................................................................................................57
Figure 25 Cross Section of the site (Image created by Yan Xu) .......................................................................................59
Figure 26 Existing site Photo (Photo taken by Yan Xu) ...................................................................................................60
Figure 27 Existing site Photo (Photo taken by Yan Xu) ................................................................. 61
Figure 28 Existing site Photo (Photo taken by Yan Xu) ................................................................. 62
Figure 29 Master plan of selected area ...................................................................................... 70
Figure 30 Stormwater management and Water Usage ................................................................ 71
Figure 31 Land pattern and circulation ..................................................................................... 72
Figure 32 Functional zones ........................................................................................................ 73
Figure 33 Master plan of the agricultural planting garden (Image created by Yan Xu) ............... 75
Figure 34 Bird’s eye view of site indicating the different use of space (Image created by Yan Xu).......................................................................................................................... 77
Figure 35 Entrance of the agricultural planting garden (Image created by Yan Xu) ................. 78
Figure 36 Farm land in the garden (Image created by Yan Xu) .................................................. 79
Figure 37 Vegetated pergola in front of the visitor center (Image created by Yan Xu) .............. 80
ACKNOWLEDGEMENTS

Thank you to the Department of Landscape Architecture & Regional Planning in Umass Amherst. It provides me with a strong skill set for being a landscape architect from the 3 years of practice.

Thank you to my committee chair, Mark Lindhult, for your insight and direction. You kept me motivated throughout the entire process, pushing me to dig deeper and make this project the best that it could possibly be. I am truly grateful that we were able to work together on this project.

Thank you to my committee member, Robert Ryan, for introducing me green infrastructure and urban agriculture concepts. I appreciated the encouragement you provided me regarding my research and also for helping me to improve my writing skills.

And finally, thank you to my family and friends. As the only international student in my studio, I have received lots of help from every one. And my special thanks to my parents, for your support to help me fulfill my dream of studying landscape design and providing the opportunity for me to have an enjoyable time in this beautiful country.
ABSTRACT

This master project proposes a restoration plan for building a modern agricultural planting garden in an urban area for Shenzhen Central Park, China. There are various challenges in the selected area including weak accessibility, lack of social activity, and loss of cultural identity. This paper will propose a restoration plan based on field study, literature review, background data analysis, and case studies. Urban agriculture practice and community garden study provide guidance on the selection of strategies to deal with those challenges in the urban context. Specific concepts include sustainable urban development and creating social and cultural experiences.

The design proposal includes a larger scale urban area conceptual plan and a focused area schematic plan. Multiple functions have been proposed to deal with the complex urban challenges. The broader scale plan deals with the preservation and management of land, and integrates planning and management of relationship between urban and agricultural lands. The finer scale plan creates a new public open space from various aspects including active community space, environmental education, stormwater management, and cultural identity. This multi-functional agricultural planting garden explores the possibility of developing agriculture as a way to improve community and urban health in the future of the city.
CHAPTER 1 – Project Introduction

Shenzhen Central Park is located in the heart of the Commercial Business District (CBD) of Shenzhen. The size of the park is 1,230,000 m² (=303.9 acres). The restoration project of the park is aimed at improving the utilization of the park and connecting people back to their agricultural heritage. Shenzhen as the representative city has experienced rapid urbanization and population growth. Urbanization strongly changes the nature of the land pattern and has a big influence on the regional ecosystems. In recent years, there are various new park projects in the urban area in Shenzhen, the old land pattern has changed a lot.

The restoration plan focuses on how to improve the historic and cultural landscape as well as being coherent with the existing urban landscape. According to the idea of community garden and green infrastructure of permaculture has been applied to many cities in the world, this project is aimed at the implementation of agriculture in Chinese cities. The quality agricultural and cultural landscape is going to help the modern cities set up a new identity regarding to social communication and city culture.
CHAPTER 2 – Literature Review and Case Studies

2.1. Literature Review

With rapid economic development and urbanization process in China, the landscape pattern in urban area has changed during the past 30 years. The rapid urbanization in Chinese cities results in many new urban challenges and new need of people. In the past three decades, the regional landscape in Shenzhen has changed from a typical agricultural landscape to a rapidly urbanizing landscape.

This project uses Shenzhen Central Park as an example of urban public space in rapidly developing city. First, the research attempts to provide an overview on the various aspects including city transformation, human history, and community needs of new urban park and how it affects city life. The level of urbanization and the increase of resident’s income have lead new requirements for a better living environment and community in the city. Therefore, the restoration plan needs to consider the new relationship between the open green space and people. Park tells history of community and city, as well as, connects people back to the past. Place memory and landscape values are important in city park planning, park development should
allow for community-based restoration of cultural heritage. The modern agricultural park brings the idea of combination of agricultural production and tourism services. It offers park to improve the economical, ecological and recreational values, while developing an attraction for both local residents and tourists.

2.1.1. City and park

1. Shenzhen as the representative of the rapidly developing city

Shenzhen has been reconfigured since the 1979 economic reforms. Shenzhen's modern cityscape is the result of 'reform and opening'. In the past three decades, Chinese cities have transformed themselves from monotonous, homogenous, and stagnant places into colorful, diverse, and vibrant magnets. At the same time, an ever-increasing proportion of the Chinese population resides in cities: the nation level of urbanization has increased from about 20 percent in the early 1980s to more than 40 percent today. New urban and economic developments are transforming the nature and structure of China's cities. (Friedmann, J, 2005)

This pace of change sets Shenzhen apart from most cities with special policy ‘reform and opening’. Shenzhen's modern
cityscape is the result of the vibrant economy made possible by rapid foreign investment since the institution of the policy of "reform and opening" establishment of the SEZ in late 1979, before which it was a town with a population of 320,000. The city has experienced continual and ever accelerating changes, which has a population of over 10,000,000. The economic reform can be read from the scale and urban space, land markets, central business districts, historical memory, urban development in specific cities, housing and residential mobility, and migrant settlements. (Piper Gaubatz, 1997)

As the urbanization going in the city, new problems occurred in the urban public parks in the past 30 years. After three decades of urban renewal in China, public spaces used by average residents have not been improved proportionally and, in some cases, have even deteriorated. (Pu Miao, 2011) Some problems can be identified. Their locations and outdated have made residents less willing to use these spaces.

2. New concept in park design

Give back park to people
Research starts on the relationship between people and park on how to balance the serving for people and sustainable development. Take the case study method provided by Mark Francis, Give the park back to people: the idea is design for people, serve the social and recreational needs of different people in city. In addition, talk about how to balance the serving for people and urban sustainable development. Design on functional purpose: make desirable green open space, multi functional use of landscape in the busy urban area for residents and visitors. Be benefit for the ecological environment: increase the land of public green space in the city. The tendency of the new park works well in the city.

Park tells the story of city

There are numerous parks that already tell histories of family, community, state, and nation, and this study supports such visions. A distinguishing characteristic of these methods was to elicit several histories that otherwise would bot have been voiced, and therefore not have an opportunity to be represented as part of the landscape. (Poff, 2006) Successful establishment and maintenance of the history of city required the alienation of such practices and practitioners, a task well-suited to the institution of the urban park, which recast the meaning of nature found within and urban space in multiple
ways. (Gabriel, Nate, 2011) Modern society increasingly utilizes landscape in a great variety of ways and for many purposes. This poses a complex pressure on cultural landscapes, threatening landscape qualities. (W Vos, 2010) The new kind of nature that, however proximate to the city, was characterized by an absence of people and, more to the point, distance from economic activity. The urban park came into being as an old vision of the city was fading, and a new vision of the city bustling metropolis and the site of industrial was emerging. They are able to form relational connections across neighborhood, reinforcing them through sporting and social activities, and practicing their identified as emerging urbanities through the city spaces.

2.1.2. Park and agriculture

The transformation of lands to restored ecosystems, park lands, and other open space is the concern of this project. The new park brings back the combination of agricultural production and tourism services from rural areas to urban. It offers a way to improve the quality of agricultural products and services, while developing multiple functions of agro-tourism, which have wider economic, environmental and social benefits, creating opportunities for integrated and sustainable urban development. (Yang Zhenshan, 2009)
1. Economic value

Low intensity agriculture brings economic recreational values in natural areas. It is going to make land to be concentrated among major cooperative organizations and agricultural enterprises, which not only has satisfied requirement of development of modern high-efficiency agriculture by enterprises for utilization of the scale of land, but also has been helpful to pushed forward standardized production and operation of enterprises and to increase economic values.

The technology park will incorporate a mix of research and development, testing and certification activities, and will attract firms developing and manufacturing high-value food, medicinal, therapeutic and cosmetic products derived from fruit, vegetables, herbs and non-timber forest sources. The park will also provide training and business incubator facilities. A distinctive feature of the park is to undertake and commercialize research into the nutritional and medicinal properties of the unique flora. (Gary Ho, 2011, Report-Brunei’s New Agro Technology Park)
2. Eco function

Agriculture itself is an integral nexus of society and ecology over time, a coevolution of culture and nature, humans and landscape (Zimmerer and Bassett 2003, Wells 2011). Industrial agriculture and the globalized food system have increasingly occluded this relationship, expanding the physical and cognitive distances among producers, consumers, and their supporting environments (Goodman and Watts 1997). An attempt to broach sustainable agriculture, therefore, demands attention to its social-ecological nature, and an understanding that agriculture produces landscapes that are at once social, cultural, and ecological (Cronon 1996, Wittman 2009). Special measures related to ‘conservation and upgrading rural heritage’ have helped to fund agricultural parks projects including ecological restoration and landscape-scale ecological infrastructure management.

It is interesting to connect eco benefits to the social benefits.

The construction of natural reserves will be emphasized and more attention will be paid to the protection of biological diversity, natural ecosystems, animals and plants. The primary benefits is the social criteria areas of ‘work’ and ‘quality of rural life,’ resulting from agricultural tourism and through payments for ecosystem services. Local residents gain human
health benefits through access to fresh, traditional foods, access to natural and agricultural landscapes close to urban centers, and opportunities for direct relationships with producers. Regional social benefits are in the areas of democracy, resiliency, quality of rural life, and cultural and biodiversity conservation. (Bacon, 2012)

3. Visitor attraction

A botanical garden will be constructed as part of the structural landscaping for the agriculture park, which will make it a visitor attraction as well as a location for new business activities.

It is great opportunity to visit the agro technology parks for visitors, students and families to understand the miracle of science. Singapore can be a great example of the agro technology parks. The high tech agricultural planting and experimental parks encourage the production of vegetables, livestock, fruits, eggs, the breeding of birds, milk, food fish, etc., along with boosting the growth of flowering plants, aquatic plants etc. Amalgamation of beauty and technology for a purpose to increase productivity in produce makes these parks a must visit for tourists, it is sure to enthral visitors by its fascinating concept. (From Focus Singapore website)
4. Interactive lifestyle

The projects are sold as contributing to the "kampong lifestyle" in housing estates, hearkening back to a time when many residents of the island grew their own food for their families and communities. This spirit is even more evident in so-called illegal or semi-legal farming plots, often established along streams or on slopes by residents who want additional space to grow food or who cannot afford to take part in the official programs. This desire to grow food and the recognition that it doesn’t take much space to do it, connects residents to the land, creates a sense of community, and allows those who cannot afford fresh vegetables, fruit and other products like herbs and flowers, to provide for themselves separate from the corporate-driven system of food. The benefits of local produce, particularly if it is organically grown, include lessening the ecological food print of the city - less travel time, less fossil fuels. Another benefit is known where your food comes from, how it is grown and who has grown it. This is an invaluable lesson for both children and adults and leads to the support of another food security principle, that of food utilization. Their relation with the park represented their habitual everyday practices and other times their memory of a particular moment in their past in which events and experiences were relived. Themes were identified in text that reflected public values relevant to park planning and expressed aspects of community life, local heritage,
or linkages between residents and groups of people in the community—past and present. Examples of such text included pride in local culture, positive emotions elicited from community events or festivals, sense of belonging to a segment of the community, or comments that championed aspects of one’s community and lifestyle. This project frames community-based values related to park development as more than preferences or statements of opinions.

5. Education

Place meanings and values of landscape are represented through narratives that inextricably link people to their community and their natural environment (Cronon, 1992). The urban agricultural garden will promote environmental education, which would raise the public awareness of sustainable development and improve the public attitude toward the healthy environment and city life in the long run and finally achieve a sustainable urban area.
2.1.3. City and agriculture

1. The city land use transformation

The gradual reduction in the cultivated land area and the dramatic increase in the built-up areas illustrate this progress clearly. Indices for the landscape spatial pattern have changed substantially. Some of the changes, reflecting the reasonable control of urban planning on the regional landscape, are the consequence of careful planning. (Li, Weifeng, 2005)

The diversity of the whole landscape was mainly associated with the natural and ecological conditions, such as topography and landform, while its changes were strongly affected by the whole level of social and economic development. The large-scale conversion of farmland to urban built-up area was induced by the combination of two different forces, the inner-to-outer (urban-to-country) and the outer-to-inner (country-to-urban) forces. In summary, the dynamics of regional landscape pattern in Shenzhen during the past 20 years could be described as follows: industrial investment (including foreign investment and social fixed assets investment) broadened the industrial land by impelling the industrialization process; meanwhile, the level of urbanization and the residents' income increased and, as a consequence, the residential and tertiary industrial land
increased. The extension of urban built-up area, which primarily consists of industrial land, residential land and the tertiary industrial land, resulted in a reduction in agricultural land such as farmland. The main driving force for the changes in landscape diversity derived from the social and economic factors, while the natural and ecological conditions were an important factor restricting landscape diversity (Wang et al. 1997; Zeng et al. 1999; Zhou 2000). Place meanings were elicited from the remains material culture such as cemeteries, build structures and leftover foundations, water courses, and feature of the landscape.

2. Identity of urban-agricultural contexts

Place meaning and landscape values are important to identify in urban-agricultural contexts of park planning. The place meanings provided two principles for the envisioning parks on the urban-agricultural fringe. The first principle is that park development should embody public memories of the landscape and provide the community with a sense of its ecological and cultural heritage. The second principle is that park development should allow for the community-based restoration of
ecological and cultural heritage.

How do we represent the city, how to build a new urban identity of the city? There is inter-relationship between the urban identity, public memory and urban space. The urban cultural landscape has been reshaped to create a new urban identity. The public space is linked to various city history. One of the most common uses of urban space is in connection with nation-building projects and the formation of national identity as ‘imagined community’ (Anderson 2006). In particular, urban space can be instrumental in the making and remaking of public memory (Johnson 2004).
2.2. Case Studies

The section describes a series of projects that will inspire and give weights for planning in Shenzhen. These will be developed through a number of existing website and articles. These projects were chosen for various aspects: 1, the agricultural planting park in Chengdu china is a great success in the area since it opened in 2008. The park is a comprehensive agricultural theme park, which is a mix of modern high tech agriculture synthesis demonstration, the promotion center, the green agricultural product production farm, the popular educational land and urban sightseeing agriculture. From cultural and recreational aspects, these attract a lot of people to be in close touch with nature and have fun in the garden with family. 2, New York central park (778 acres) is 3 times the size of Shenzhen central park (277 acres). They both grow with the city, NY central park has over 150 years history while SZ central park has about 35 years history. The citizens have a lot of memory of the park and the park has been in close relationship with its people and past. They can help SZ central park to play a role people’s life and record the history of the city. 3, Chicago Millennium Park is one of most beloved and user-friendly place in dense urban area of modern city. Millennium Park is successful as a public art venue in part due to the grand scale of each piece and the open spaces for display. These are brilliant ideas for the accessibility of Shenzhen central park. 4, take Lim Chu Kang as one example
for agro technology Park in Singapore, which becomes a popular tourist attraction that provides visitors with a chance to experience rural farm life in Singapore. The industrial development takes away the land from agriculture. The farms in the agro technology park are designed to provide a complementary mix of agricultural activities that blends well with Singapore’s predominantly urban environment. Products include vegetables, poultry and ornamental flowers, to unusual ones like frog and quail. Berlin urban agriculture projects show how farm engages with the community through its Farm program. Measure the environmental benefits of urban agriculture when employed as part of the city’s green infrastructure system. There are various scales of urban agriculture programs of raising vegetables, flowers, chickens and bees. They earn about a third of their income by selling goods through on site farmer market, community supported agriculture program, and local grocery stores, and supplying weddings and events. These bring people closer to their food source, promote awareness and increase communication, all resulting in a healthier and more vibrant city.
2.2.1. New York Central Park

Location: Manhattan in New York City

Date designed: original design completed in 1858, redesigned in 1962

Construction completed: 1873

Size: 778 acres

Landscape architect: Frederick Law Olmsted and Calvert Vaux

Client/developer: New York City Department of Parks and Recreation

Central Park is one of the most famous sightseeing spots in New York.

While planting and landform in much of the park appear natural, it is in fact almost entirely landscaped. The park contains several natural-looking lakes and ponds that have been created artificially, extensive walking tracks, bridle paths, two ice-skating rinks (one of which is a swimming pool in July and August), the Central Park Zoo, the Central Park Conservatory Garden, a wildlife sanctuary, a large area of natural woods, a 106-acre billion-gallon reservoir with an encircling running track,
and an outdoor amphitheater, the Delacorte Theater, which hosts the "Shakespeare in the Park" summer festivals. Indoor attractions include Belvedere Castle with its nature center, the Swedish Cottage Marionette Theatre, and the historic Carousel.

In addition there are seven major lawns, the "meadows", and many minor grassy areas; some of them are used for informal or team sports and some set aside as quiet areas; there are a number of enclosed playgrounds for children.

The six miles of drives within the park are used by joggers, bicyclists, skateboarders, and inline skaters, especially when automobile traffic is prohibited, on weekends and in the evenings.
2.2.2. Farmlands in Lim Chu Kang - Agrotechnology Park in Singapore

Location: North of Singapore and is bounded by the Johor Straits, the Kranji Reservoir and the Western Water Catchment of Singapore

Date designed: Agrotechnology programme has been applied on the farmland in 1980
Construction completed: 1986

Size: 792 acres

Landscape architect: ?

Client/developer: Agri-Food and Veterinary Authority

Farms in Lim Chu Kang today are modern intensive farms that optimize the use of the limited agricultural land in Singapore through the application of science and technology. In recent years, the area has also become a popular tourist attraction that provides visitors with a chance to experience rural farm life in Singapore.

In the early 19th century, Lim Chu Kang comprised mainly of pepper and gambier plantations. Rubber plantations subsequently overtook these, in response to the development of the motorcar industry and the corollary increase in demand for rubber products. In the 1960s, domestic demand gave rise to numerous vegetable, fruit, poultry, and pig farms in the area. Such farming did not require large pieces of land, and most were family-run farms that used traditional farming methods and produced a mix of products in addition to a main crop/produce.
In the 1970s and 1980s, rapid industrial development in Singapore led to a decrease in agricultural land use in Singapore. Pig farming was phased out gradually in the 1980s and the Primary Production Department (PPD) embarked on its agrotechnology programme in 1986. Agrotechnology is defined as the application of biological science and technology to intensive farming systems. Agrotechnology parks that house intensive high-technology farms were initiated and encouraged by the PPD as a means to maximise output from Singapore's limited agricultural land. Under the programme, farmlands in Lim Chu Kang, Murai, Sungei Tengah, Mandai, Nee Soon and Loyang were converted into modern agrotechnology parks.

The Agrotechnology Park in Lim Chu Kang became fully operational in the mid-1990s. The farms in the agrotechnology park are designed to provide a complementary mix of agricultural activities that blends well with Singapore's predominantly urban environment. The Lim Chu Kang Agrotechnology Park houses a diverse range of farms, from those that produce common commodities like vegetables, poultry and ornamental flowers, to unusual ones like frog and quail farms.

In 2000, selected farms in Lim Chu Kang participated in a new initiative by the Singapore Tourism Board to boost tourism in Singapore. These farms served as tourist attractions for visitors to experience Singapore's rural farm life. Farm tours to Lim Chu Kang were given a boost in 2005 when the Urban Redevelopment Authority (URA) allowed farms in Singapore to take in
guests for farm stays and to run retail shops or food outlets on their own premises. A growing number of farms in Lim Chu Kang started providing such services as a means to supplement the income from their farming activities. In May 2008, under the URA’s island wide Leisure Plan, Kranji and Lim Chu Kang were earmarked for tourism and agri-tainment development. Agri-tainment activities include farm-stays, spa treatments, guided strolls through plantations and hands-on farming activities. Today, visitors to the agrotechnology park can participate in interesting activities like viewing goat milking demonstrations and drinking fresh goat’s milk at Hay Dairies (3, Lim Chu Kang Lane 4), or learning about the intricacies of frog farming at the Jurong Frog Farm (55, Lim Chu Kang Lane 6). Visitors can also opt for a farm stay at the D’Kranji Farm Resort (10, Neo Tiew Lane 2), stroll through greenhouses and learn about aeroponics farming at the Aero-Green Technology (260, Neo Tiew Crescent), or purchase farm fresh vegetables and fruit at Bollywood Veggies (100, Neo Tiew Road) and Spring Orchard (1, Lim Chu Kang Lane 4). However, not all the farms at Lim Chu Kang are involved in agri-tainment, some farms are closed to the public and only do pure farming activities.
Figure 2 Lim Chu Kang - Agrotechnology Park in Singapore (Image resource: http://www.nparks.gov.sg/cms/index.php?option=com_visitorsguide&taskparks&id=12&Itemid=73)
2.2.3. New Princess Garden, Berlin urban agriculture Project

Location: Berlin, Germany

German name: Prinzessinnengärten

Date designed: 2009 Summer

Client/developer: Nomadic Green

Idea of the Garden:

1. Locally grown organic vegetables. Our fresh, organic, locally produced herbs and vegetables are grown in raised compost beds without using any pesticides or artificial fertilisers.

2. Mobile Gardening We temporarily transform unused spaces such as buildingsites, car parks and roofs into urban farmland and green meeting places.

3. Sustainable Living The Prinzessinnengarten is a place of discovery where children, neighbours, experts and those curious about sustainable living can come together to about and explore alternative visions for our city.
Nomadisch Grün (Nomadic Green) launched *Prinzessinnengärten* (Princess gardens) as a pilot project in the summer of 2009 at Moritzplatz in Berlin Kreuzberg, a site which had been a wasteland for over half a century. Along with friends, activists and neighbours, the group cleared away rubbish, built transportable organic vegetable plots and reaped the first fruits of their labour.

Imagine a future where every available space in big cities is used to let new green spaces bloom. Green spaces that local residents create themselves and use to produce fresh and healthy food. The result would be increased biological diversity, less CO2 and a better microclimate. The spaces would promote a sense of community and the exchange of a wide variety of competencies and forms of knowledge, and would help people lead more sustainable lives. They would be a kind of miniature utopia, a place where a new style of urban living can emerge, where people can work together, relax, communicate and enjoy locally produced vegetables.

In future ever more people will be living in cities rather than in rural areas. The city will therefore become the decisive place for the development of more sustainable ways of eating, living and moving. The city of the future should be a climate-friendly, pleasant place to live, where every care is taken to conserve our natural resources.
Prinzessinnengärten is a new urban place of learning. It is where locals can come together to experiment and discover more about organic food production, biodiversity and climate protection. The space will help them adapt to climate change and learn about healthy eating, sustainable living and a future-oriented urban lifestyle. With this project Nomadisch Grün intends to increase biological, social and cultural diversity in the neighbourhood and pioneer a new way of living together in the city.

Information resource: http://prinzessinnengarten.net/about/
Figure 3 New Princess Garden in Berlin (Photo taken by Yan Xu)
2.2.4. Agricultural planting park in Chengdu, China

Location: Southern suburbs of Chengdu, Sichuan, China

Date designed: NA

Construction completed: 2008

Size: 3,000 acres

Landscape architect: NA

Client/developer: Huaxi Hope Group

The park is Asia's largest artificial cultivation of azaleas showcase, with more than 130 varieties, carefully nurtured over 500 million trees and all kinds of rhododendrons, azalea vases, hollow cuckoo styles, azalea blooms, weeping azalea rhododendron flower varieties is unique in the world.

The park is a comprehensive agricultural theme park, which is a mix of modern high tech agriculture synthesis demonstration, the promotion center, the green agricultural product production farm, the popular educational land and urban
sightseeing agriculture. The park had considered the design agricultural, ecological and environmental protection, as well as functioned as dam, demonstration, sightseeing, and entertainment leisure. In the completed portion, there is a greenhouse demonstrated modern agriculture characteristic form north and south of china, and modern fruit and flowers transaction hall.

Adhering to the concept of "nature", the park in the design Shunshan, sailing, homeopathy, developed under the premise of the protection of natural resources, leading the fashion of low-carbon tourism in the United Nations Sixth Global UN Forum on the title of the scenic best examples of a global low-carbon.

Figure 4 Agricultural planting park in Chengdu (Image resource: http://www.hxhopegroup.com/main)
2.2.5. Lafayette Greens urban garden, Detroit, Michigan

Lafayette Greens is a vegetable and fruit garden in the heart of downtown Detroit that re-imagines urban agriculture as a new kind of urban place that enriches and enhances the urban experience. Producing fresh food in our cities, right where we live, work and eat, brings together green space, public space, public health, community engagement and sustainability into city spaces that are imbued with propose and meaning, grounded in place, and that renew our connection to the natural world. These landscapes are not only productive in the economic sense, as in food production and work opportunities, but also productive in the cultural sense, as a place of meeting and expression of place, including cuisine, visual and performance arts.
Figure 5 Lafayette Greens urban garden (Image resource: www.asla.org)
Chapter 3 - Methodology

3.1. Goals and Objectives

This master project use cultural landscape design as a tool to revitalize the central park to meet the new needs of people and city. The goal of the project is to improve the social interaction between the park and people, and therefore to improve the park as a part of citizens life and revoke the city memory.

Objectives to meet:

1) Conduct a site analysis of Shenzhen central park and find the area that can be designed for agricultural planting garden.

2) Demonstrate the application of agricultural planting design through a conceptual design of the park.

3) Identify program opportunities appropriate for the site.

4) Set up new cultural identity for the park in the city.
3.2. Research methods

The research methods include site visits, literature review, background data search, interview with government and park service office, sites analysis, case studies, site assessment, design process and final proposal.

1. Literature review helped to identify the problems and potentials for cultural landscape, green infrastructure implementation and sustainable design in the urban park.

2. Data search includes the history and existing conditions of the park. The data of existing conditions cover the information about physical environments, demographics, community life and previous plan of the park.

3. Site analysis covers the investigation on geography, topography, soil, hydrology, land use, traffic, park management. Based on the site analysis, the location and approach of green infrastructure implementation were selected for the site. The proposed restorative plan maintains space spirit and takes sustainable design in mind.

4. Case study shows good examples of urban parks and success agricultural planting projects.

5. Site assessment includes a whole analysis of the site and its context. The assessment helped to clarify the existing condition and the potential development area for urban agriculture, and informed the identification of challenges and opportunities for
the selected area.

6. Informed by an understanding of urban agriculture ideas gained through literature review and existing projects as a series of precedent studies, the design process began. And came up with a site plan that would address the needs of surrounding community.

7. The final proposal set up a model for a modern agricultural planting garden in urban area. More details on the design and programming will be articulated in Chapter 4.
Chapter 4 – Project Background

4.1.1. Introduction of the land

The park land was planned to be part of the greenbelt for separating traffic and residential area in 1988.

The land was turned into a public park in 1993 and was then opened to the public in 1999. Since there was undeveloped land surround the park, the park kept a low utilization over time. As the city had transformed into a modern city from the agriculture-based history, people’s desire for the park has changed. In the new plan made in 2010, the public park integrated picturesque nature view, sightseeing, recreation and daily activities. Understanding the design concept of two design plans made in 1999 and 2010 would help the designer of the park to keep the people’s needs in mind, as well as, the land serves as a green open space for the city.

The park is part of the city and regional greenway.
4.1.2. **Context and Geographic Character of Shenzhen Central Park**

Introduce the background of the project including the context and geographic character, natural character, history and existing condition of the Shenzhen central park.
4.1.2.1. Location

Figure 8 Shenzhen Central Park in context of China > Guangdong > Shenzhen (Image Source: www.baidu.com/image/shenzhencentralpark)

Shenzhen Central Park is located in the heart of the Commercial Business District (CBD) of Futian. The size of the park is 1,230,000 m², and it is 2,300 m from south to north and 800 m from west to east, in a linear shape.

The park is adjacent to the Bijiao Mount Park, which is part of the regional greenway. This provides the park the great opportunity to be connected to the greenway plan.
Figure 9 Shenzhen Central Park connected to the regional greenway. (Image created by Yan Xu)
Figure 10 Five Parcel in Shenzhen Central Park and the acreage of the area (Image and table created by Yan Xu)
Outstanding features of each parcel

Parcel A

- Upstream of Futian River
- Nice waterfront view

Figure 11 Features in Parcel A (Photo taken by Yan Xu)
Parcel B

- Hill walk
- Open lawn
- Tennis court and basketball playground

Figure 12 Features in Parcel B (Photo taken by Yan Xu)
Parcel C

- Performance stage
- Sculpture garden

Figure 13 Features in Parcel C (Photo taken by Yan Xu)
Parcel D

- Embracing forest with mango, lychee and palm trees

Figure 14 Features in Parcel D (Photo taken by Yan Xu)
Parcel E

- Traditional structure
- Man made fishing pond
- Exercise plaza

Figure 15 Features in Parcel E (Photo taken by Yan Xu)
4.1.2.2. History

The land was planned in 1988 as a part of the greenbelt used to separate traffic and residential area. The land was officially set up in 1993 as an urban park and named Shenzhen central park. It was redesigned in 1999 and 2010. The park has suffered low utilization during the past few decades, but after the construction was done in 2013, the park has been developed to a public space for walking, family gathering, having a picnic, cycling and flying a kite.

Figure 16 Shenzhen central park in 2001 (Image resource: www.baidu.com/image/ shenzhen central park)
4.1.2.3. Topography

The topography of Central Park mainly consists of bush land, two ponds and Futian River. The Mount Bijia, on the north side of the park, provides nice view. The surrounding residential area and business district create an urban background with buildings for the park. The topography of the area has great merit in providing amenities for recreational development, both in the bush land and along the waterfront.

4.1.2.4. Hydrology

The Futian River comes from Mount Bijia and runs through the park. Most of the stormwater and sewage go into this river and finally runs into the Shenzhen Bay. The river provides water for irrigation in the park and creates nice waterfront experience for visitors.

Figure 17 Site hydrology map
4.1.2.5. **Green space**

The Central Park has the potential to be planned into an interesting point on the greenway. Make strong green connection between the Central Park and Mount Bijia Park.
This park also plays an important role in the green space network in the dense urban area. As the park is linear shape with a river running through, there is potential to build consistent greenway inside the park. In addition, the park is surrounded by residential and business district where it is potential to create more entries for the park and make strong connection with the neighborhood.

Figure 19 Green space and proposed greenway plan
4.1.2.6. Land use

The dominant land uses in the area are residential and commercial use. Commercial areas are scattered in the residential area and partially gathered along the roads. The rate of public green area is very low and not in a system. Generally, the Central Park serves the neighborhood as the main green open space.

Figure 20 Land use map
4.1.2.7. Transportation

The park is surrounded and defined by a series of major roads and a highway. Those roads and highway act as a strong edge of the park. The city arteries divide the park into different parts, but the public transportation that runs on them provides good accessibility for the park as a result.

Figure 21 Transportation connection in the area and park entrances
4.1.2.8. Park management

The park is managed by the Shenzhen Central Park Service. The planning decisions are made from the Park Service Department, which is a subordinate of the City Planning Department. The Shenzhen Central Park Service Office coordinates the management and regular maintenance of the park.

Shenzhen City Planning Department

Shenzhen Park service department

Shenzhen Central Park service
The challenges of this management strategy include: inappropriate planning decisions as a result of incomplete analysis from lack of public involvement, short term study period caused misunderstanding of ecological function, and strong government control reduced public involvement during planning design process.

4.1.3. Context of focus area in Shenzhen central park

4.1.3.1 General information

The focus area parcel D occupied an area of 98936 square meters (=24.4acre).

Compared to other parts of the park, the D parcel is the smallest one. It has weak connection to the C parcel because the Shennan Avenue cuts through them and it is connected to E parcel by tunnel. Part C and part E, which are adjacent to Part D, are composed of art and recreation. There are lots of built elements and hard surface in the part C and E. In converse, part D has rich landform, which can be developed naturally, that creates unique natural experience for visitors.
The parcel D is surrounded by residential, commercial and institutional lands, and serves as the open green space in the area. Creating more connections between the park and the neighborhood would invite more people from the area. There are existing tunnels and bridges providing potential new entries for the park.

Parcel D
- 24.4 acres of land, smallest parcel of the park
- Connected to Parcel C by bridge, and connected to Parcel E by tunnel
- Rich kinds of landform can be interesting to visitors
4.1.3.2 Historic heritage- Lychee forest

There used to be large Lychee forest in the park years ago, but a lot of them were cut down for the new development and management issue. In the interview with the park user, they mentioned the memory of the lychee trees and tasty fruit. In the
early summer when lychees get mellow, the land is covered with green leaves and heavy fruits, that look like red clouds wafting here and there. The red lychee fruits are so fresh and tasty which make people love it very much.

Lychee trees grow very well in the climate and become people’s beloved trees in Shenzhen. There is a small lychee forest along the Futian River, which provides nice canopy for the visitor and charming views for the park from east. (Figure )

Figure 24 Lychee forest view (Photos taken by Yan Xu)
4.1.3.3. Site view

There are steep slopes on the rim of the site, which is about 10%-18% incline, covered with trees and shrubs. These small hills on the site act as a hedge of the site, provide an enclosed space in the park, as well as create a green nice view for the outside dense urban area. The site is relatively flat in the center, which provides possibility for the flow and activity of people.
Figure 25 Cross Section of the site (Image created by Yan Xu)
4.1.3.4. Existing photos presenting various elements on site

Figure 26 Existing site Photo (Photo taken by Yan Xu)

- Large area of wild growing bush land on the site.
- Paved path and dirt road come across each other are not indicating a clear circulation system.
Figure 27 Existing site Photo (Photo taken by Yan Xu)

- High rise building surrounded and highway nearby.
- Lack of attracting waterfront feature.
- River cut the connection between park and dense urban area.
- Water quality management issue.
Figure 28 Existing site Photo (Photo taken by Yan Xu)

- Tunnel connect Parcel D to other parcels, accessibility issues.
4.2. Agricultural planting Garden Design Proposal

4.2.1. Major Challenges and opportunities in the selected area

1) Weak connection to the other part of the park on north side

2) Water pollution in Futian River from the dense urban area

3) Loss of cultural identity

4) Lack of recreational open space and activities, which play a significant role of healthy urban life

5) Isolated from the neighborhood by highway and river

4.2.2. Strategies

1) Take advantage of the existing bridge and tunnel to strengthen the connection to the north part of park and the neighborhood

2) Storm water management and plants for water quality improvement
3) Provide new identity to the area with modern agriculture

4) Create public space with multi-functions that will provide more rich social experience for the neighborhood

5) Provide environmental and ecological education space for children and students

4.2.3. Conceptual Plan for Selected Area

4.2.3.1. Prime development area

Improve the social and cultural experience for people by creating new attraction in the park and improve the accessibility of the park. Propose 4 entrances for the park. The north entrance serves for people coming from north of the central park and is close to two bus stops on the city artery. Bridge and tunnels allow people to come from the surrounding area, which are going to form new entrances of the park.
This circulation plan shows green way from north to south, but also there is a strong desired flow line from west to east. The green area shows the preservation forest on the site, including the mature lychee forest. The center part of the area has appropriate potential to be planned for urban agriculture. The orange area which is relatively flat, has low vegetation, and is on circulation spine, would be considered as the prime area for development.
4.2.3.2. Urban agricultural ideas applied to the site

1. Community garden

A conventional community garden concept with raised wooden beds, bark mulch pathways, and a space for children comes from the primary idea of agricultural garden in the urban area. The new proposal of the urban agricultural garden would include the use of sustainable materials, spaces for public use and enjoyment, future and ongoing public art projects and a fun educational Garden for children and students.

Looked closely at the relationships between the garden and the surrounding urban context. In spite of the enthusiasm for urban agriculture, there are also many reservations and questions about whether this type of activity is appropriate in the city and urban living experience. Aesthetics, environmental concerns, productivity and economics all need to be addressed. The urban agricultural garden as a sophisticated urban space, productive and multi-functional as public space, green space and community space. The space can in the garden is used to accommodate events, workshops and gathering.
2. Urban Bio-diversity

The land has an extensive and mature plant collection, which includes palm trees, lychee trees and mango trees, display a nice tropical scenario of the region. In the new plan, vegetables, herbs, flowers, heirloom fruit trees, vines, berries, native species short orchard meadow would be planted and add diversity to the urban environment and habitat for pollinators. Biodiversity is the goal of the park and the rich plant collection is one of the major components of its design. Moreover, the modern agricultural park essentially requires biodiversity and sustainability. With this in mind, the new plan of the park can be a fulfillment of creating and maintaining a biologically diverse, self-sustaining space.

3. Efficient Organic Growing Methods

The entire garden is going to be managed organically. Bio-intensive raised beds with drip irrigation are highly productive with a potential 200-400% increased caloric production vs conventional gardens, consume less water and require low energy inputs.
4. Educational

The urban garden in that it is a public space that is participatory. Anyone can take part in planting, harvesting, learning and teaching. It is a place to meet, participate in the group activities and learn from them. The garden is a showcase for urban growing techniques.

The modern productive vegetable garden is also a tangible expression of the possibilities for integrating urban agriculture into city spaces and city life in a way that is beautiful, productive and attractive. The urban agricultural garden will promote environmental education, which would raise the public awareness of sustainable development and improve the public attitude toward the healthy environment and city life in the long run and finally achieve a sustainable urban area.

4.2.4. Schematic Plan for Selected Area

4.2.4.1. Master plan of selected area

It is going to be a pleasant urban park composed of many charming structures and landscape. The construction of the park absorbs the
natural history from whole length of the city, merging with the modern excellent botanical garden construction.

Figure 29 Master plan of selected area
4.2.4.2 Plan of focus area

There is wide variability in infiltration rates across the land. The garden is an opportunity to showcase and demonstrate sustainability.

The water run across the site and can be used ideally for irrigation. An urban bioswale catches and slows stormwater runoff. With informative signage, it also catches attention and raises awareness about the water issues in the Futian river. Most of the site’s surfaces are pervious: gravel, lawn and planting beds.
Stormwater flow come down hill and irrigate the site. The flat large farm land harvest stormwater as a source for irrigation water on row crops. Which raise the awareness of the important of health environment effect the production of the foods. To develop safe and efficient stormwater harvesting, filtration and treatment technologies and encourage more stormwater harvesting, or continue to discourage the use of stormwater on food crops.

Figure 31 Land pattern and circulation

By travelling through the site, visitors will learn and experience-growing techniques adapted for the city climate. The agriculture land lies on the north side of the primary greenway trail. With grid planting and open view of the farm, they are easy to rest to on a bench.
or enter the garden and explore over 50 types of vegetables, fruits and flowers. The forest trail carries people through all the different area of planting and interests. The agriculture trail offers people specific experience of immersing themselves into an active and colorful farmland.

Figure 32 Functional zones

Various interests and excitement has been added to the area. The new plan brings the urban agriculture, community gardening and new technique trial into the urban area. A productive vegetable garden that also functions as an engaging public space, it is a tangible
expression of the possibilities for integrating urban agriculture into city spaces and city life in a way that is participatory, beautiful and productive.

The different farms on the site include:

1. Traditional farming- traditional planting for crops
2. Container farming- crops grow in defined containers
3. Micro farming- crops grown in cylindrical bags
4. Vertical farming- crops grown in vertical sculptural structure and integrated in to shaded area
5. Square foot farming- planting beds divided into smaller sections used for growing various crops
6. Plastic culture farming- using plastics to extend the growing season and improve climate for crops
7. Flower bed- planting of different flowers regarding to their color and season
8. Orchard- planting of fruit trees and nut trees.
Figure 33 Master plan of the agricultural planting garden (Image created by Yan Xu)
4.2.4.3. Space use and programs on site

The concept of community garden act as a productive and multi-functional as public space, green space and community space.

The open orchard meadow and flowerbeds close to the greenway trail serves the workers and citizens as a space to take a break from their busy working life. The visitor center can be used as a classroom for children and students from the area, as well as the interesting trial garden and vertical garden. The farmland provide daily and weekend activities for groups of gardeners and visitors in order to increase and enhance community recreation, exercise and education.
Figure 34 Bird’s eye view of site indicating the different use of space (Image created by Yan Xu)
4.2.4.4. Site perspective

This perspective shows many seating benches are provided throughout the garden to encourage public use of the space.

Figure 35 Entrance of the agricultural planting garden (Image created by Yan Xu)
This perspective shows the weekend activities for groups of gardeners and visitors, and afterschool playground for children and students.

Figure 36 Farm land in the garden (Image created by Yan Xu)
The perspective shows the new structure provides the shade area for people to resting and gathering, and picnic area for enjoying the open view of the agriculture farm.

Figure 37 Vegetated pergola in front of the visitor center (Image created by Yan Xu)
Chapter 5 - CONCLUSION

The challenges involved in this project are complex and interwoven, which might be a trend in urban development nowadays: rapid urbanization, lack of urban green space, less communication, and low environmental awareness. In order to deal with these challenges, a multi-functional design idea is essential for the restoration of the city park. Building a modern agricultural garden regarding to the city memory and need of social interaction is an appropriate approach in such a project.

The research on city and agriculture provides a basis to understand the definition, history, planning progress and its connection to the city life. The design idea is inspired by this research and some urban agriculture case studies. Many practical approaches are discussed in this project, include urban farming, ornamental gardening, management of open space, and integrated planning of developing urban and agricultural lands. The modern productive vegetable garden also functions as an engaging public space, it is a tangible expression of the possibilities for integrating urban agriculture into city spaces and city life in a way that is participatory, beautiful and productive. The urban agricultural garden will also promote environmental
education and cultural identity; these could improve the public health and attitude toward the city life in the long run and finally achieve a sustainable urban area.

As the recent and continued rapid urbanization, China has a challenge to improve its urban areas to modern, sustainable, interactive and environmental friendly public space. It has the important opportunity to demonstrate to other rapidly-growing cities and countries of the world how to create social and cultural experiences and live a healthy life in urban area.
BIBLIOGRAPHY


MILTON, KAY., 1996-last update, Environmentalism and cultural theory exploring the role of anthropology in environmental discourse [Homepage of Routledge], [Online].


