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# River Keepers Urban Agriculture Demonstration Area

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Maegin Rude - Summer 2010





## Background and Summary

I was raised on a poultry farm near the tiny town of Tolna, North Dakota. I grew up learning what farm life was all about; I knew what hard work and long hours were, I understood the importance and dependence of family, I knew where my food came from and I respected the Earth. I never knew it then, but I'm realizing now how important my upbringing was, and although I didn't like it when I was young, I wouldn't have wanted anything different.

I was starting another semester at a different school in the fall of 2007; I was accepted in the landscape architecture program at NDSU when I finally felt like I had chosen a path I could stick with. The curriculum stressed sustainability and taking care of the Earth when designing the landscape, and the students were told we were "stewards of the land". All these ideas started to make perfect sense and reminded me of growing up on the farm. I soon decided to broaden my studies and get a minor in natural resources management.

An urban agriculture seminar class was being offered in the spring of 2010, by Kathleen Pepple, one of my professors of landscape architecture. It was a new experience; only a few other colleges in the country offer a similar class. Through research and speakers, I learned really how important knowing where your food comes from is, how some large cities are struggling and are only able to survive by utilizing urban agriculture, and how small spaces can produce large amounts of food, when there is becoming less and less farmable land.

In April of 2010, I met with Bob Backman and Christina Laney from the River Keepers Organization to discuss internship opportunities. I was immediately interested when it was suggested there was an opportunity for demonstration area, one idea being for urban agriculture. With the demonstration area, I would be able to show the ideas I learned about in the urban agriculture seminar. Soon after this discussion, my experiment with urban agriculture started.

In May, before the garden was started, I went to the Living Lab to check out the area. Bob gave me a tour around, and told me what the Living Lab was all about. One specific part of the Living Lab intrigued my interest over the course of the summer. It was an eagle nesting platform that had recently been installed. Every time I went to the Living Lab, I glanced over hoping to see signs of new inhabitants.

Over the course of the summer, when I was at the River Keepers Living Lab tending to the urban agriculture garden, people occasionally would wander through and ask questions or comment. This demonstration area hopefully served as a catalyst to encourage others to start their own urban gardens. This demonstration area was meant to inform others, but was a great learning experience for me, as well.

It was a warm fall, so the garden produced into October. The day before there was to be a hard frost, I went to the Living Lab for the last time to remove the garden materials. As I made my way to the garden, there was an eagle flying towards the Living Lab. I froze, hoping it would land on the platform. The eagle swooped lower as it circled over the Living Lab several times, then continued to make its way south. Although the eagle didn't stop to rest or make a home on the platform, I consider the eagle to be a good omen, and one that I will never forget.

# Urban Agriculture Garden Proposal

This project will demonstrate a variety of gardening methods other than the traditional row gardens. The types of gardening will show examples of “three sisters” gardening, lasagna gardening, square foot gardening, and vertical gardening. The gardening methods are detailed below.

These gardens will be demonstrated at the River Keeper’s Living Lab site at 5508 Univ. Drive in Fargo. The gardens will be located at this site because this project fits with one of the sites goals: to demonstrate practices of water conservation.

## **Three Sisters Garden**

This garden is based on Native American method of planting. It uses three vegetables: corn, beans, and squash. The corn grows in the center of a small mound, with the beans next to the corn so they are able to vine while adding nitrogen into the soil. The squash is planted around the mound, which creates a groundcover to help with weeds. This garden area will measure approximately 5’ in diameter.

## **Lasagna Garden**

This type of gardening is low maintenance and uses a variety of mulches. When weeds appear, mulches such as organic waste, grass clippings, straw, or newspapers are used to cover the weeds and break them down to create fertilizer for the garden. This garden will consist of different types of herbs and vegetables. This garden will be approximately 4’x4’.

## **Square Foot Garden: Salad Garden**

Square foot gardening is a system of gardening that is space efficient, uses less water, and is less labor intensive. The placement of plants is carefully determined, to maximize production and minimize space. Gardens are usually 3’x3’ or 4’x4’. This garden will be in a 4’x4’ space and will feature plants such as a variety of lettuces, spinach, tomatoes, peppers, onions, carrots and cucumbers. This garden will not be raised, but will have a thin, wood grid pattern on top of the soil to show the square foot garden and how it is planted.

## **Vertical Garden**

This garden will support trellising plants. Two V-shaped trellises will be made using 2’x2’ untreated lumber, measuring approximately four feet tall, 1.5 feet in width, and a base of 4 feet, with woven lath (measurements may vary, depending on construction). The trellises will be attached to stakes in the ground to stay in place. Plants to trellis will be peas and beans. Depending on conditions, a different trellis structure may be used.

Whole garden space will be 25’x8’. Because of the wildlife, a chicken wire fence will surround the garden. Gardens will be sparingly watered, only when necessary. All weeding and preparation will be done by hand. No chemicals will be used. Working space and paths will have a wood chip cover to deter weeds.

Each garden will have laminated signage with information about each gardening style, how each garden was constructed and planted, plants used in that garden, and websites to visit for more information. A documentation booklet will record process and progress throughout the summer, including photos, illustrations, and informational websites. Information about the site and photos showing during the growing season will be on a Facebook (social network). The booklet will be turned into the River Keepers Organization in the fall, after all gardening operations cease and space is completely void of any materials.

# Signage for the Urban Agriculture Garden

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## Urban Agriculture: River Keeper's Living Lab

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### What is Urban Agriculture:

Urban agriculture is the process of growing food in and around a city or urban area. One type of urban agriculture is food production, or vegetable gardening. There are many benefits to growing your own food, including having the freshest produce, controlling chemical use on the produce you eat, it is better for the environment (transportation and chemical use), and often times providing more nutrients than storebought, by eating it shortly after it is picked. Urban agriculture is a great outdoor hobby and provides exercise. Gardening is also a good learning experience for children.

### Urban Agriculture Demonstration Area:

This project will demonstrate a variety of gardening methods other than the traditional row gardens. The types of gardening will show examples of "three sisters" gardening, lasagna gardening, square foot gardening, and vertical gardening. The gardens are located at this site because this project fits with one of the sites goals-to demonstrate practices that practice water conservation.

This garden show how produce can be grown in small spaces, using less water. These types of gardens can be built with inexpensive or free materials, using a variety of things you may already have. These gardens are a variation of each type, based on things such as available materials, cost, and location.

Come back throughout the summer to see the progress!

Find the FaceBook page by searching River Keeper's Urban Agriculture Demonstration Area.



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## Seeds

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### Square Foot Garden:

Heirloom Lettuce Tom Thumb Butterhead - Mini Head  
Organic Cilantro  
Organic Carrot  
Organic Spinach *Bloomsdale Long-Standing*  
Organic Onion *Evergreen Long White Bunching*  
Organic Radish  
Organic Mesclun *Classic Mix*

### Lasagna Garden:

Organic Chives  
Organic Lettuce *Black-seeded Simpson*  
Organic Spinach *Bloomsdale Long-Standing*  
Organic Broccoli  
Organic Onion *Evergreen Long White Bunching*  
Organic Mesclun *Classic Mix*  
Organic Oregano  
Organic Radish

### Vertical Gardening:

Organic Summer Squash Zucchini  
Organic Summer Squash *Early Summer Crookneck*  
Organic Cucumber *Sweet Burpless Hybrid*  
Organic Garden Bean *Hidatsa Shield*  
Heirloom Pea Thomas Laxton Delicious

### Three Sisters Garden:

Organic Garden Bean *Hidatsa Shield*  
Organic Summer Squash Zucchini  
Organic Summer Squash *Early Summer Crookneck*  
Organic Sweet Corn *Golden Bantam*

Plant List does not include tomato or pepper plants, at which time this list was compiled have not been planted.



## Lasagna Garden

### Lasagna Gardening:

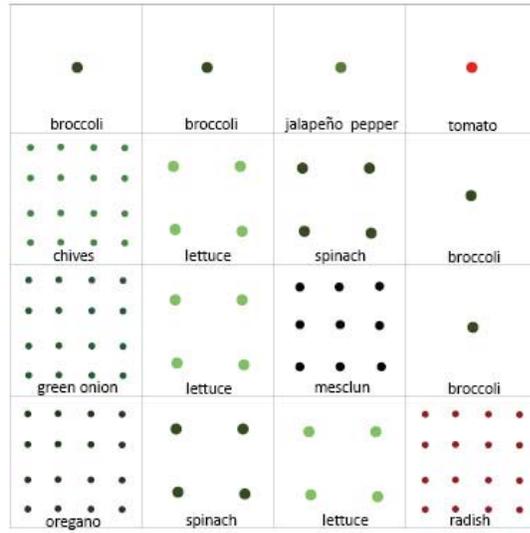
This type of garden has little to do with plants grown, but more about the style. It is low maintenance and uses a variety of mulches. When weeds appear, mulches such as organic waste, grass clippings, straw or newspapers are used to cover the weeds and break them down to create fertilizer for the garden. Make sure that whatever mulch is used, it does not contain chemicals or toxins. Most newspapers use soy-based inks, which are safe.

### How this garden was planted:

This garden is a variation of lasagna gardening. This garden is planted in 4'x4' square foot style, but all weeds will be covered with newspaper. Plant layout was determined by height and plant needs. Several seeds were planted in each hole for maximum growth. All plants were seeds except for tomato and pepper plants. Seed plants were planted on May 20. Any variety of plants can be used.

### Seeds:

All seeds used in this area are USDA certified organic.



**Additional information:**  
<http://www.lasagnagardening.com/>



## Square Foot Garden: salad garden

### Square Foot Gardening:

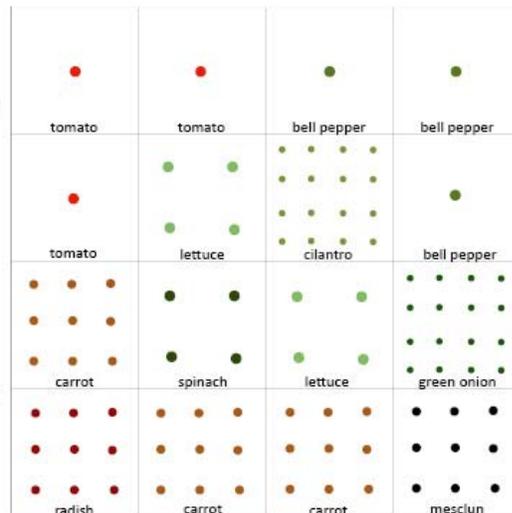
Square foot gardening is a system of gardening that is space efficient, uses less water, and is less labor intensive. This type of garden condenses plants, unlike traditional rows. The placement of plants is carefully determined, to maximize production and minimize space. Gardens are usually 3'x3' or 4'x4'. Many square foot gardens are raised and contain a growing medium of compost, peat moss, and vermiculite.

### How this garden was planted:

This garden is a variation of square foot gardening. First, a 4'x4' grid was nailed together using 1"x2"x4' strips of wood, which is used as a guide. The grid was secured using wire staples. Then, plant layout was determined by height and plant needs, such as size. Several seeds were planted in each hole for maximum growth. All plants were seeds except for tomato and pepper plants. Seed plants were planted on May 20. Weeds will be pulled. Plants are not limited to ones listed here; any plants suitable for the zone can be used.

### Seeds:

All seeds used in this area are USDA certified organic, except for the lettuce, which is heirloom seeds.



**Additional information:**  
<http://www.squarefootgardening.com>



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## Three Sisters Garden

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### Three Sisters Gardening:

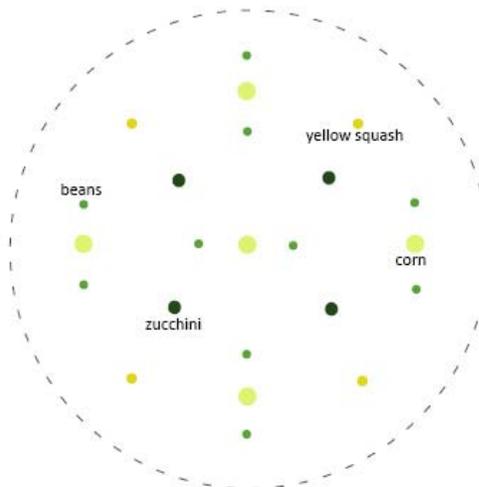
This garden is based on Native American method of planting. It uses three vegetables: corn, beans, and squash. The corn grows in the center of a small mound, with the beans next to the corn so they are able to vine while adding nitrogen into the soil. The squash is planted around the mound, which creates a groundcover to help deter weeds and protect plants.

### How this garden was planted:

Soil was raked into a mound about 4 feet in diameter, about 2 inches high. Seeds were planted in the mound: first corn, then beans, then zucchini, and last was yellow squash. They were planted in this order because of location. As plants grow, the arrangement may change slightly, if some seeds do not survive. All were seed planted on May 20.

### Seeds:

All seeds used in this area are USDA certified organic, except for the peas, which are heirloom seeds.



### Additional information:

<http://faq.gardenweb.com/faq/lists/teach/2003045258014436.html>

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## Vertical Garden

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### Vertical Gardening:

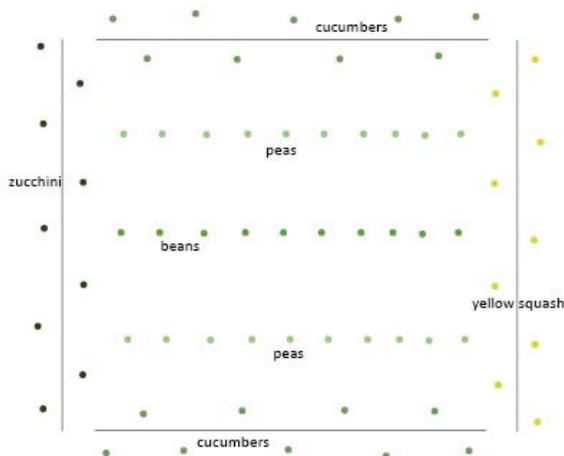
Vertical gardening can be used in very small spaces. There is a variety of ways to vertical garden, including trellising plants, using containers vertically, attaching different materials to walls to plant in, (such as gutters), as well as many more. Vertical garden can be creative!

### How this garden was planted:

This garden will show spreading and trellising plants. Squash and cucumbers were planted in two alternating rows along a 4'x4' perimeter. Short lattice will be placed between the rows for vertical spreading. Two rows of peas and one of beans are planted inside. As these plants grow, they will trellis vertically on a system based on plant needs. The beans will add nitrogen to the soil. All were seed planted on May 20.

### Seeds:

All seeds used in this area are and USDA certified organic, expect for the peas, which are heirloom seeds.





# Starting the Display Garden



## **Site Location:**

This garden, as well as the adjacent garden, was located on a area where an old house used to be. The site was near the river at the Living Lab, in an open area, free from shade until late in the day. The garden area was on a slight slope, facing south.

## **Beginning:**

The first things for the project were deciding the types of gardens to display, the plants and seeds to use, and how to utilize space. The next thing was to decide the layout and ideas for display, such as the wooden display structures and signs.

## **Soil:**

Because the site was previously where a house stood, there were some objects in the ground from the demolition. The soil in the Red River Valley is very clayey. These two things could have affected the growth of plants, whether it be good or bad, as well as some plants do better in certain soils than others.

## **Seeds and Plants:**

Seeds were planted on May 20 for all plants listed, besides tomatoes and peppers, which were planted the following week, May 27. Marigold flowers were planted throughout to attract bees for pollination. Flags were used to locate types of seeds until sprouts started to grow. Posts and a rabbit fence was put up as a barrier for curious wildlife.

## **Watering:**

Low water usage was one goal for this garden and goes along with one of River Keepers goal of to demonstrate practices of water conservation. The garden was watered several times in the two weeks after planting so the seeds could sprout. All watering after that was minimal and only during dry times.

# Square Foot: Salad Garden



MAY 20



JULY 18



AUGUST 15



JUNE 13



JULY 26



AUGUST 22



JUNE 19



AUGUST 2



SEPTEMBER 1



JULY 1



AUGUST 9



SEPTEMBER 6

**Plants:**

Cherry and Roma tomatoes, bell peppers, lettuce, cilantro, carrots, spinach, green onions, radish, and mesclun.

**The Idea:**

The square foot garden utilizes space by eliminating rows and having plants be closer together. The frame is for planting and demonstration purposes. The salad garden includes plants that would go in a salad.

**How:**

The seeds were planted May 20 and the tomatoes and peppers were planted the following week. The radish's were replanted in June, as well as the mesclun, spinach and lettuce. Tomato stakes were added to support the plants.

**Weeds:**

The weeds in this garden were not a big problem. There were some weeds, but were small and easily pulled out and discarded in the compost pile. Weeds were worst in the middle of the summer.

**Water Use:**

This garden was only watered when it was very dry and when there was little rain.

**Findings:**

Tomatoes- struggled a bit with the heat and inconsistent water, Looking the best this fall; still producing tomatoes in October.

Bell peppers- stayed as small plants; small pepper fruits, with thin skins.

Lettuce- the weather got very warm quick, which cause the lettuce to bolt; needed to be replanted and didn't sprout until August.

Cilantro- did very well, had cilantro all season

Carrots- carrots did well, however, the clay soil made the carrots short and wide.

Spinach- went to bolt, was replanted, but did not sprout again.

Green onions- grew slowly, were ready in September.

Radish- sprouted early, ready in June; reseeded in June, but did not sprout.

Mesclun- few sprouts, went to bolt; replanted lettuce in place, sprouted in fall.

**Result:**

This garden was successful. Most things in the garden produced, and what did, grew well. After tending to this garden, placement changes could have been made in order to provide some shade for the smaller plants, since the garden tended to dry out.

•	•	•	•
tomato	tomato	bell pepper	bell pepper
•	• •	• • • •	•
tomato	lettuce	cilantro	bell pepper
• • •	• •	• • •	• • • •
carrot	spinach	lettuce	green onion
• • •	• • •	• • •	• • •
radish	carrot	carrot	mesclun



# Square Foot: Lasagna Garden





# Vertical Garden



**Plants:**

Zucchini, yellow squash, cucumbers, peas, and beans.

**The Idea:**

This garden is meant to utilize vertical space for growing, and use less horizontal space, to allow for more plants to be in the same area.

**How:**

The seeds were planted May 20, as the diagram below depicts. The original idea was to build a trellis, but because of the small area and attaching problems, four sections of a wooden fence were installed for the plants to grow on, around, and through.

**Weeds:**

The weeds were less in this garden, once the squash started to grow. The seeded plants outgrew and shaded out the weeds, so there were only a few to pull at the beginning of the summer.

**Water Use:**

This garden was sparingly watered throughout the summer. The the spreading plants acted like cover and kept the ground shaded and damp.

**Findings:**

Zucchini- very successful; abundant amounts of zucchini all summer, into October.

Yellow squash- slower to start, but many squash's through summer.

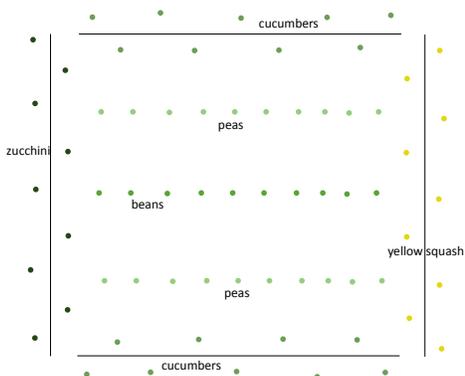
Cucumbers- very successful, spreading plants; spread up to 8 feet; grew on wooden fence and rabbit fence around the perimeter of the garden.

peas- many flowers, but got shaded out by other plants; only a few pea pods produced.

beans- successful into the fall, but competed with other plants but were hardy.

**Result:**

All in all, this garden was successful. The peas didn't produce well, but placement could have been an issue. The cucumbers produced, but were a bit shadowed by the large squash plants. Zucchini and yellow squash had many large leaves and spread. This garden grew quite large, possibly because of the nitrogen from the beans.



# Three Sisters Garden



MAY 20



JULY 26



AUGUST 22



JUNE 13



AUGUST 2



SEPTEMBER 1



JUNE 19



JULY 1



AUGUST 15



SEPTEMBER 6



JULY 18

**Plants:**

Zucchini, yellow squash, corn, and beans.

**The Idea:**

This garden is a traditional Native American method of gardening that focuses on fall production. The idea maximizes space by closely planting seeds. Corn is planted to represent north, south, east, and west; the squash is planted to spread and act as a groundcover for moisture and weeds; the beans are planted to add nitrogen to the soil and to twine on the corn.

**How:**

The seeds were planted May 20. The dirt was raked up in a mound in a three foot diameter. The seeds were planted as the diagram below.

**Weeds:**

The weeds were the least in this garden. The seeded plants outgrew and shaded out the few weeds in the early season; The large squash leaves acted as a groundcover.

**Water Use:**

This garden was hardly watered, and watered the least of all the gardens. The the spreading plants acted like a cover and kept the ground shaded and damp.

**Findings:**

Zucchini- very successful; abundant amounts of zucchini all summer, into October.

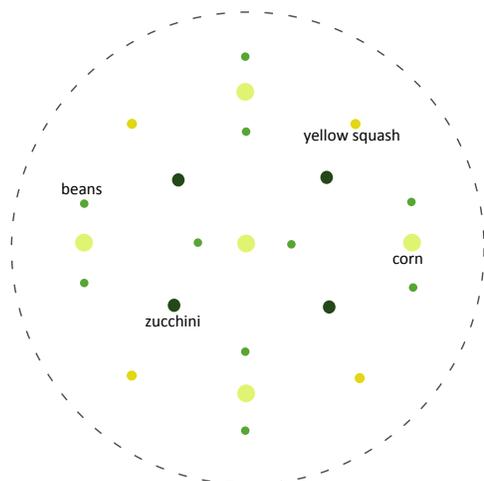
Yellow squash- slower to start, but many squash's through summer.

Beans- successful into the fall, but competed with other plants; overtook some squash plants; twined on the rabbit fence.

Corn- all five seeds grew into tall stalks; several broke because of the open area and few stalks for support; two stalks produced ears of corn; two stalks were attacked by raccoons.

**Result:**

This garden was a success. The beans twined as planned, and all the corn grew into stalks. There was a possibility that the number of corn would not be enough to pollinate, but cobs were produced. This garden grew quite large, possibly because of the nitrogen from the beans. Raccoons raided the corn, I think this was because a neighboring acorn squash spread and vined on the rabbit fence, and as the squash grew, weighed down the fence.







# Garden throughout the Summer



# Garden Production



JUNE 19



AUGUST 2



AUGUST 27



JULY 17



AUGUST 9



SEPTEMBER 1



JULY 22



AUGUST 15



SEPTEMBER 6



JULY 28



AUGUST 22



# THANK YOU!

I would like to thank Bob Backman, Christine Laney, and the River Keepers Organization for this opportunity. Without their support, the Urban Agriculture project would not have been possible. I would also like to thank Adam Jones for his help. The River Keepers Urban Agriculture Demonstration Area was truly a wonderful and educational experience.

## Maegin Rude

NDSU landscape architecture student 2010

(permanent)

2785 99th Ave NE

Tolna, ND 58103

(local)

3305 31st Ave SW

Fargo, ND 58103

(701) 351-8092

maegin.rude@gmail.com

