



# Edible Landscape Tools:

Minimum Cost Housing Group  
McGill University  
Winter Semester 2005



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# Edible Landscape Tools

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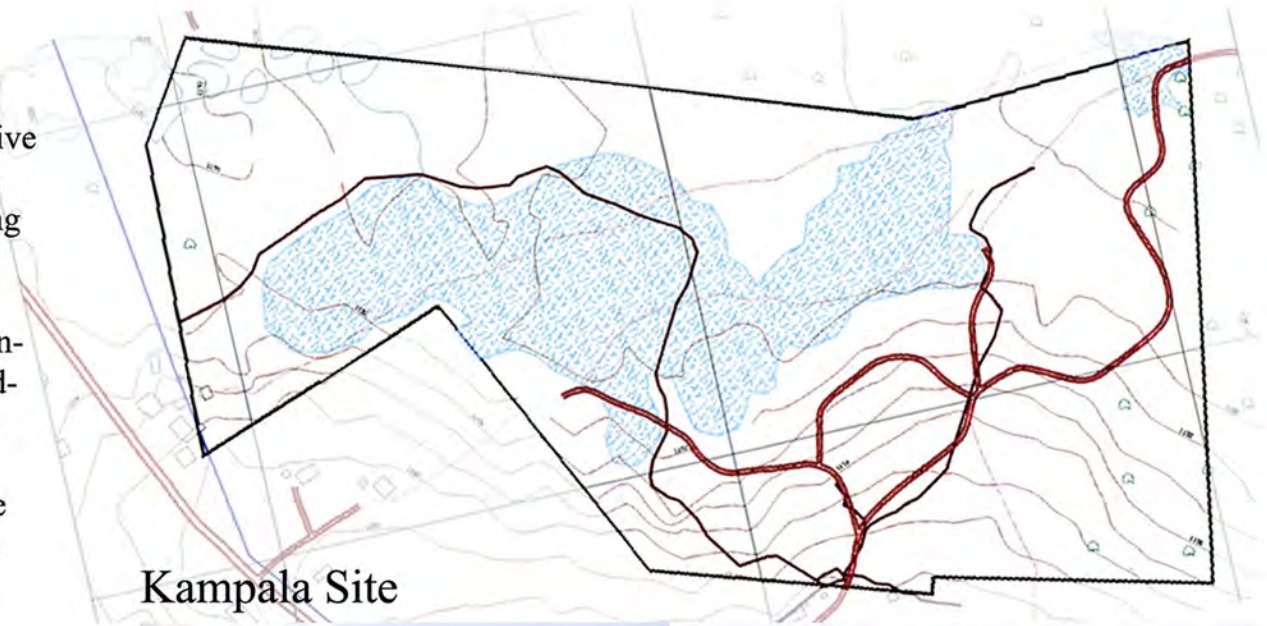
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# Introduction

Making the Edible Landscape is a three-city project with the core objective of integrating Urban Agriculture as a permanent element in low-cost housing settlements. These three participating cities are: Colombo, Sri Lanka; Kampala, Uganda; and Rosario, Argentina. From existing settlements upgrading to new urban developments in the partner cities, the project intends on applying UA as a subsistence resource for personal consumption and income generation.





Since September 2004, the Minimum Cost Housing Group at McGill University has been working closely with teams from the respective cities in developing proposals for Making the Edible Landscape project. This active exchange of ideas has been constructive for the students in receiving feedback on their proposals in relation to the local situations while presenting a new perspective to the local teams.

HALGAHAKUMBURA



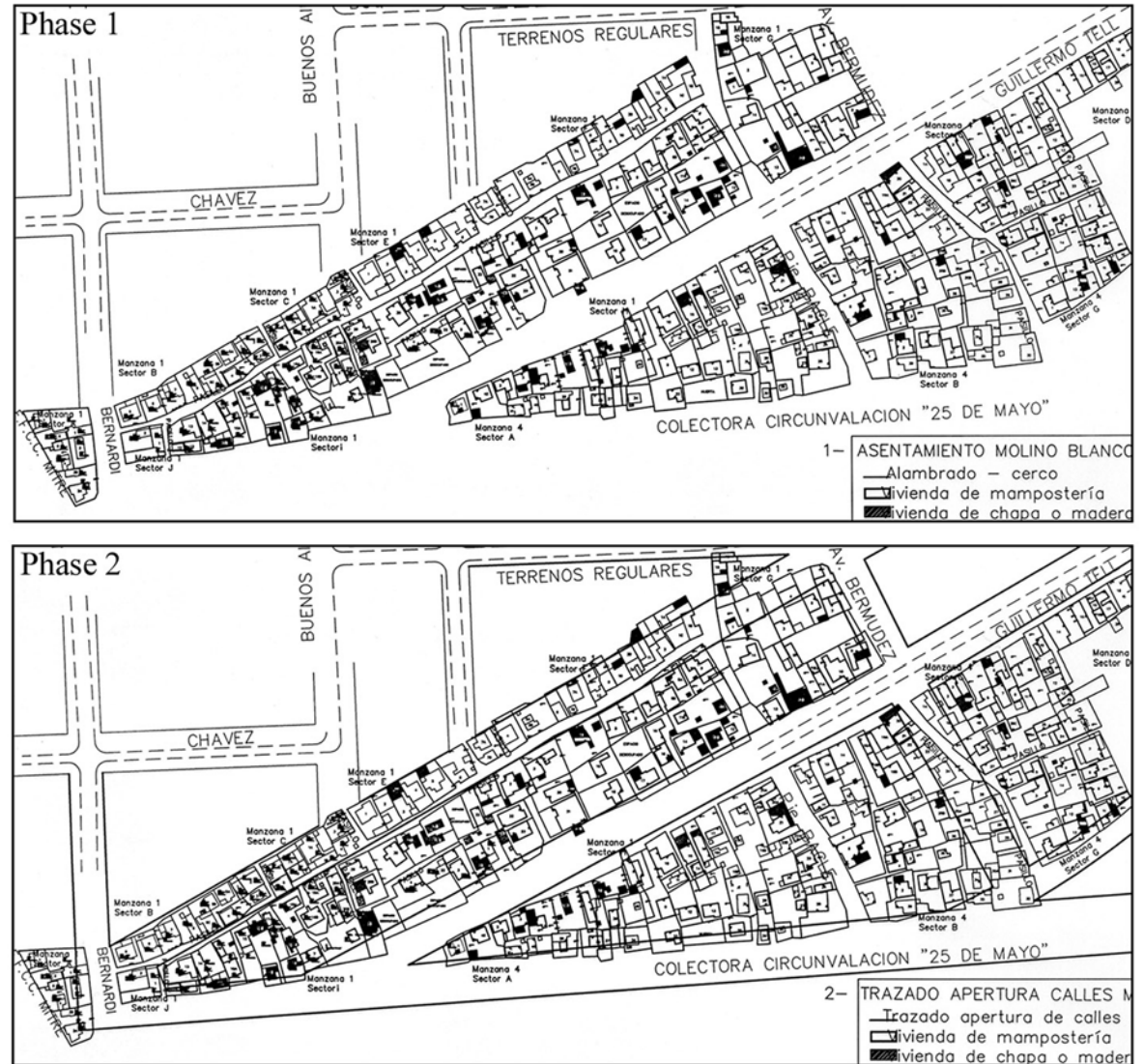
Colombo Site



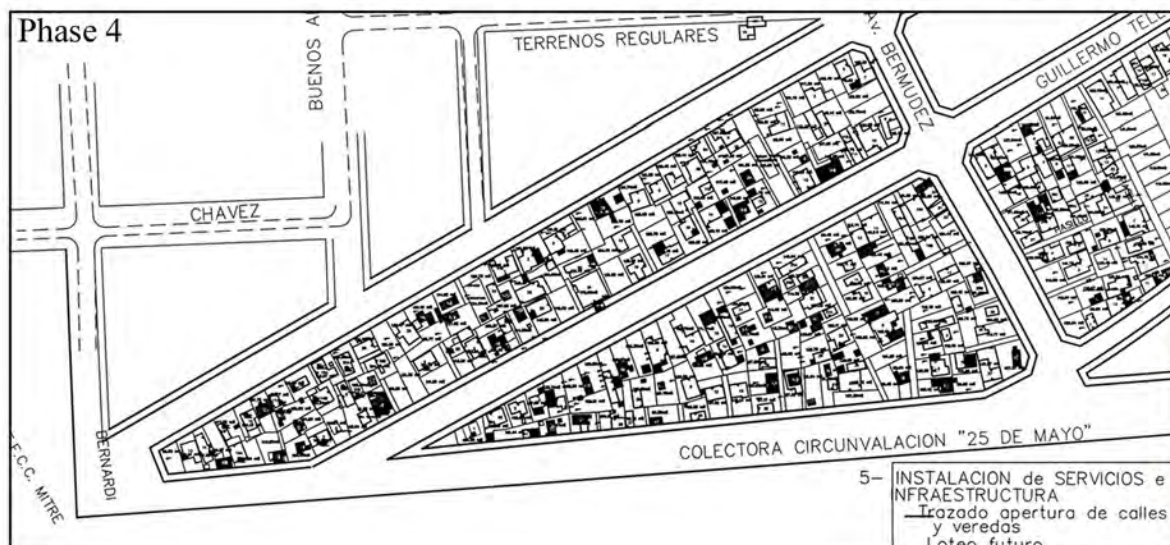
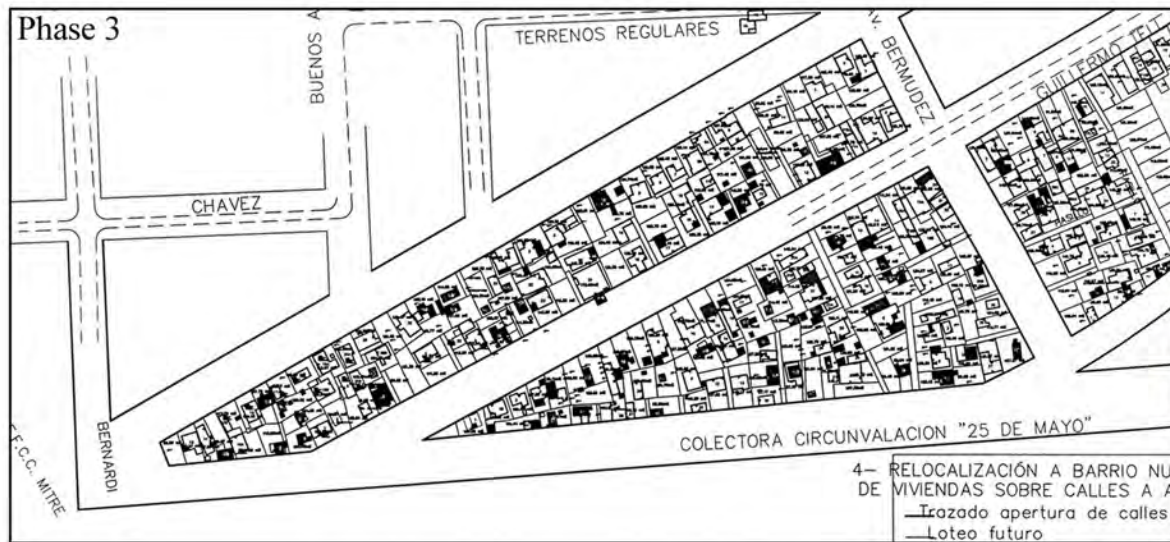
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The concept behind developing a catalogue came about early this year due to the interest of the local Rosario team in specific design interventions for one of their sites. Molino Blanco South is one of the three sites in Rosario and consists of an existing settlement selected for upgrading. The proposals for the settlement upgrading have already been developed by the local authorities to be implemented in phases as shown in these drawings. The upgrading process involves relocation of some existing houses along the site periphery, widening and straightening of streets, regularizing existing houses and lots and basic physical infrastructure provision for the residents. Since the upgrading process for the site is already in progress, the students' proposals revolve around design and research in integrating Urban Agriculture in the new plans. The students' work produced for the Rosario site inspired their later course of action for Colombo and Kampala, which is reflective in both the sections of this catalogue. The tip boxes in Part 2 were initially developed for Rosario site and have been included due to their universal applicability. While consulting this catalogue, it is recommended that the design interventions not be treated as site specific but as ideas and concepts that can be replicated with creativity in a similar situation anywhere at all.







Edible Landscape Tools

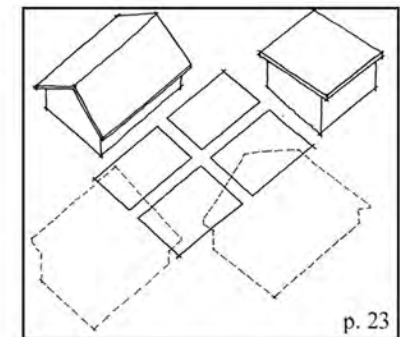
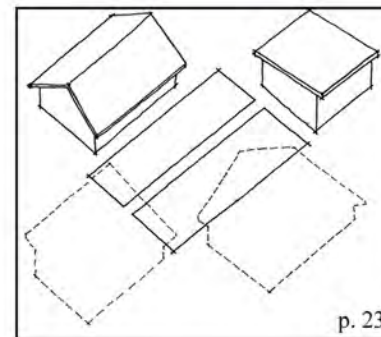
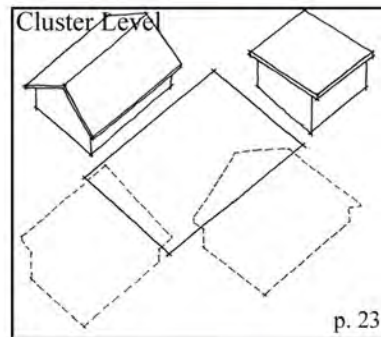
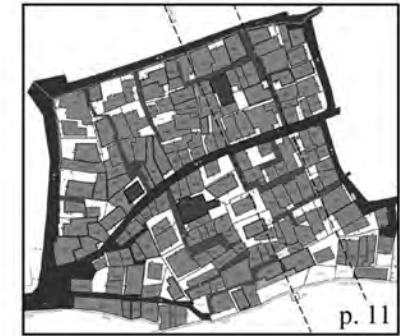
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Introduction



# Part 1: Introduction

This section is developed to integrate Urban Agriculture in situations of existing housing settlements. The main challenge in existing settlements is the lack of open spaces due to their high densities. The need is to analyze and evaluate the existing situation and to explore the possibility of introducing Urban Agriculture in even the most difficult scenarios. The section looks at UA at three scales: the macro site level, the intermediate cluster level, and finally, the home level at the micro scale. Each sub-section presents the analysis of the existing space followed by proposals for UA activities.





# Site Level: Mapping

It is important to analyze the existing situation within a settlement to be considered while developing new designs. In the case of a section of Halgaha Kumbura settlement in Colombo, Sri Lanka, mapping at the site level gives useful information about the existing percentages of open and built-up areas. The lot sizes vary within the settlement from less than 20 m<sup>2</sup> to more than 40 m<sup>2</sup>. The average size of the existing dwelling units is approximately 29.60 m<sup>2</sup>.





The high density of the built-up area becomes evident from the fact that 51% of the dwelling units do not have access to any open space. In addition those spaces that are available for growing are often small and difficult to access.

This is an important realization which demands the proposal to include alternative growing techniques in small or non-existent horizontal open spaces.

Vertical growing, such as along walls and fences, in addition to using pergolas and roof-tops can be alternative means of growing in the absence of horizontal gardens.

Access to open spaces can also be given to individual households by converting large open public spaces into community gardens. The aim is to maximize growing possibilities in difficult situations.




Edible Landscape Tools



Part 1: Site level



# Growing Walls



The map displays the City of London's street network with building footprints. Buildings are outlined in green, and those with a thick green border are designated as 'Vertical Gardens'. A legend in the top right corner shows a green line segment next to the text 'Vertical Garden'. A north arrow is also present in the top right corner.

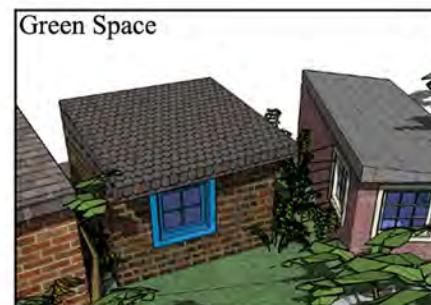
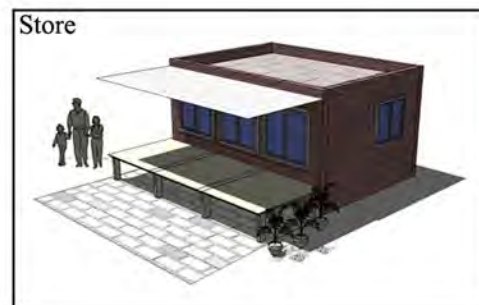
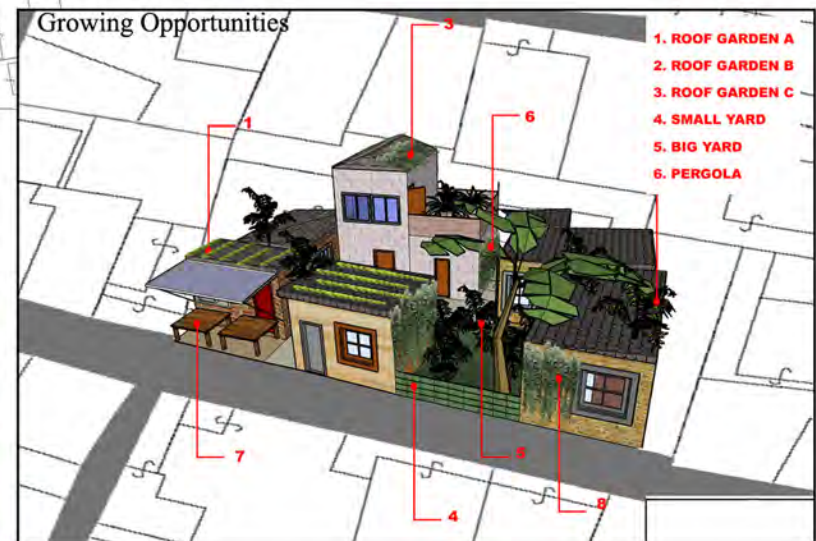
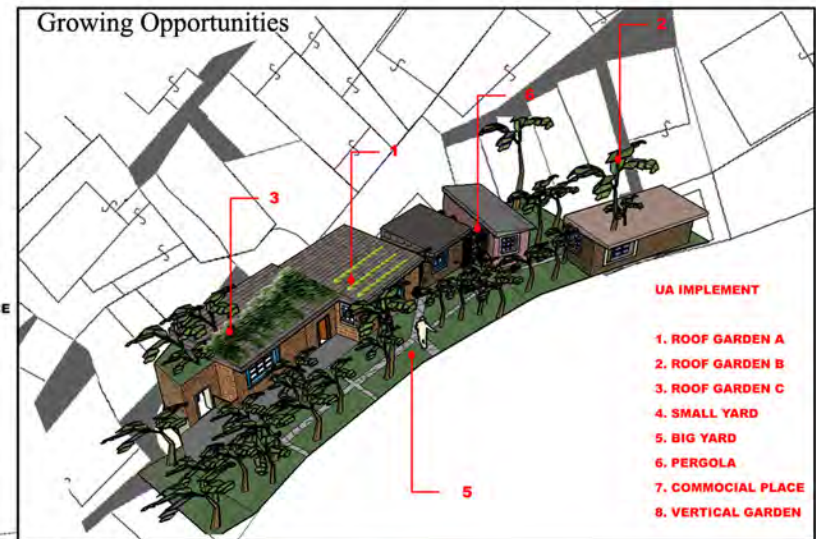
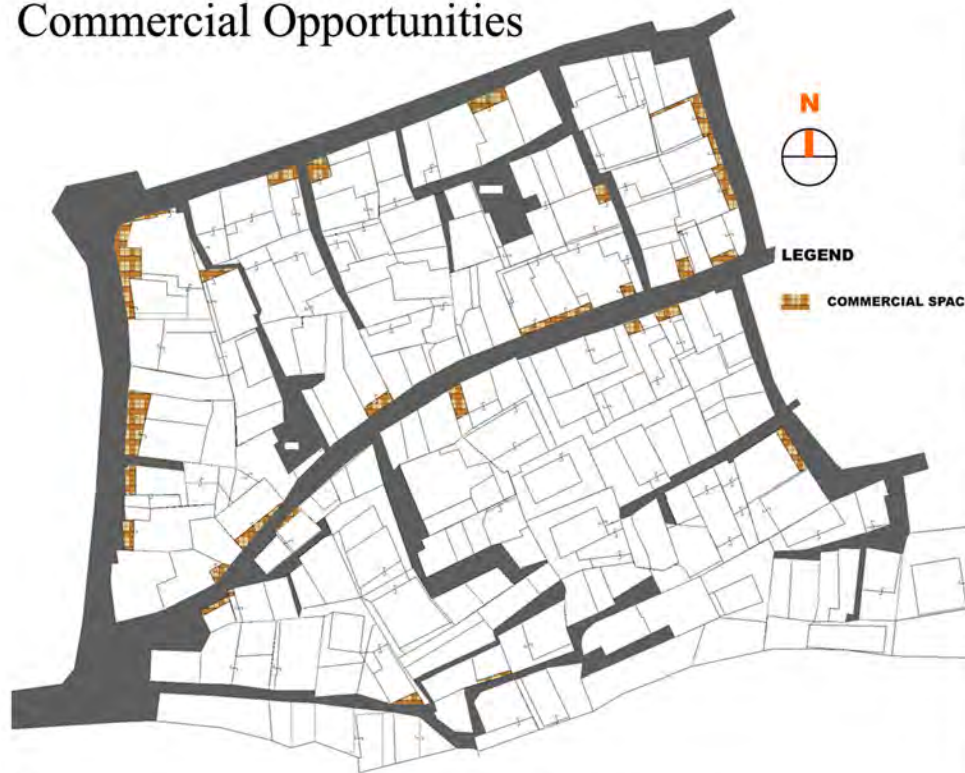
# Rooftop Growing

A map of a city block showing potential rooftop gardens. The map is titled "Rooftop Growing". It features a grid of streets and building footprints. The building footprints are shaded green, indicating potential rooftop gardens. A legend in the top right corner shows a green square with a cross-hatch pattern, labeled "Potential Roof Gardens". A north arrow is also present in the top right corner.





# Commercial Opportunities



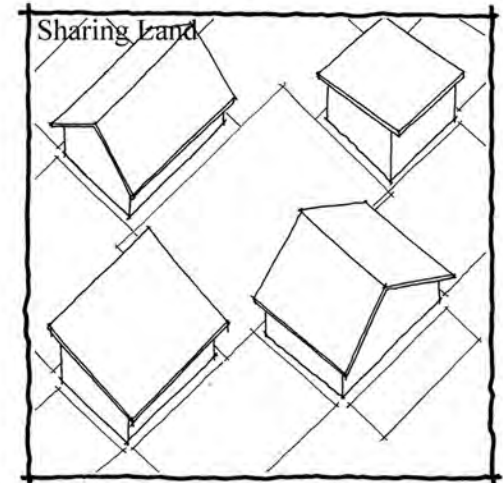
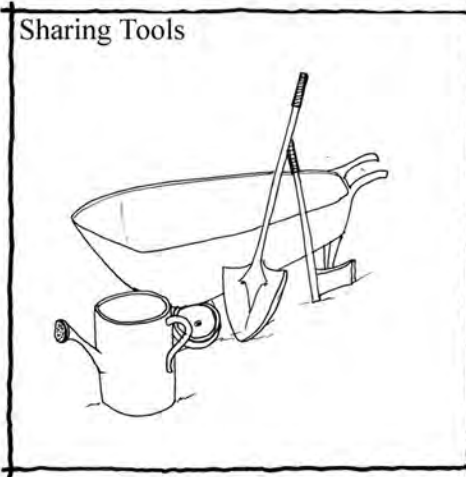


# Cluster Level: Patterns

## What are Benefits of Cluster Gardening?

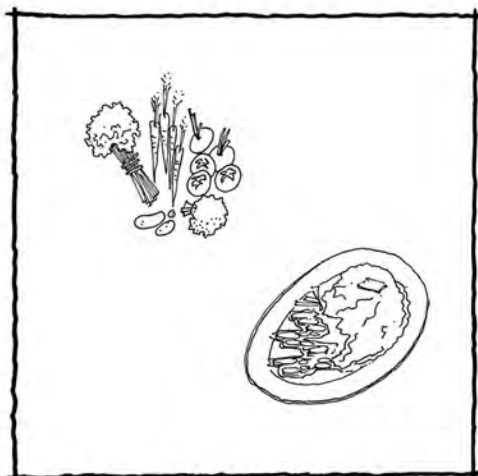
There are often within an existing settlement shared open spaces that can be converted into communal productive areas. This section presents the concept of Cluster Gardening in order to develop open spaces for Urban Agriculture. Cluster Gardening can have multiple benefits in the form of sharing resources and supplies. Small parcels of land can be combined to create larger production areas, while working together can maximize profit opportunities.

The pattern section is developed to guide individuals interested in setting up Cluster Garden within their neighbourhoods. Each pattern addresses a question that residents may have in their minds regarding Urban Agriculture in a vacant space near their houses. The aim is to identify open and under utilized spaces present in the existing settlements in order to maximize access to productive land for those who do not have private gardens.

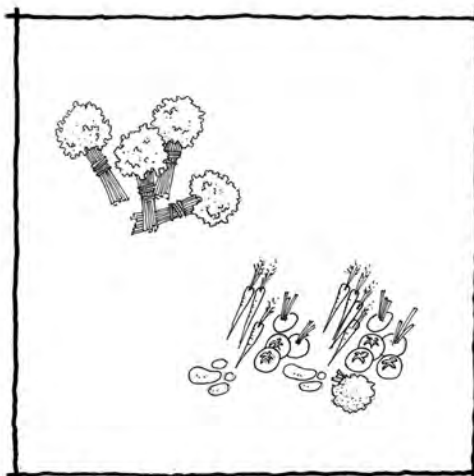




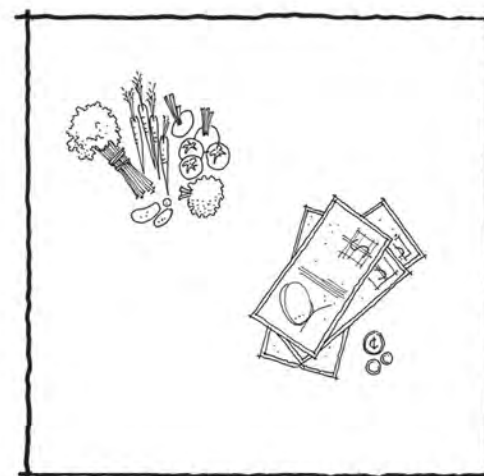
# What Can I Do With My Produce?



Personal Consumption



Food Exchange



Additional Income

## Food Processing:

There are many things that can be done with what is produced in the garden. It can be consumed by the growers and their family, it can be traded for other required goods or it can be sold for money.

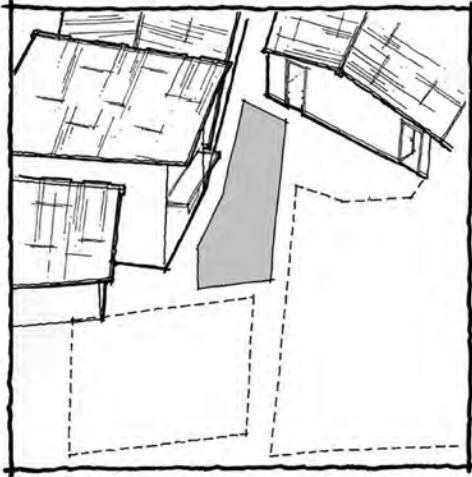


Food that is processed can often be sold for more money than one that is not. Consider ways that you can transform your excess crops into processed food, like relishes and dried spices. In addition strategies like canning and drying can greatly extend the useable life of various foods.

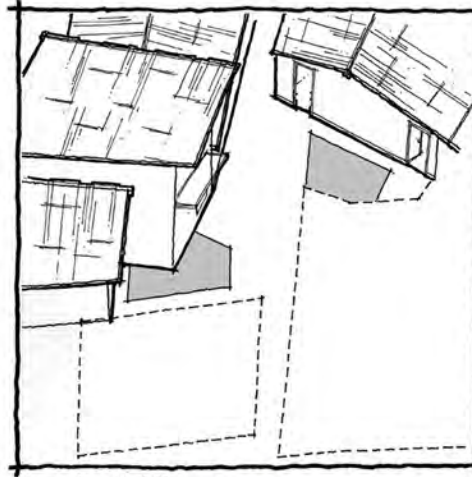




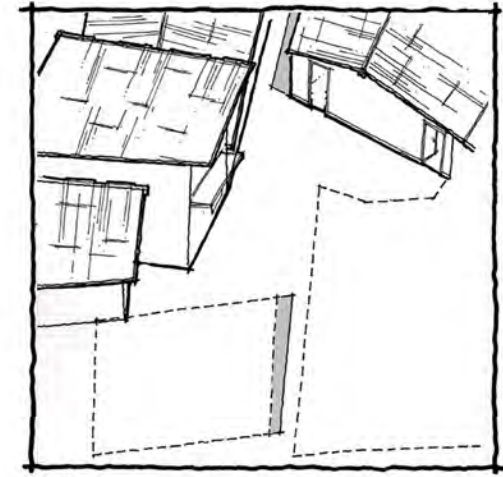
# What Types of Spaces Exist?



Public



Semi - Public



Private

## Find A Place:

Survey your area by walking around and looking at it with growing in mind. Look for places where there is unused land: small corners, strips or larger plots. Next, determine who owns the land, and whether it is private, semi-private or public.

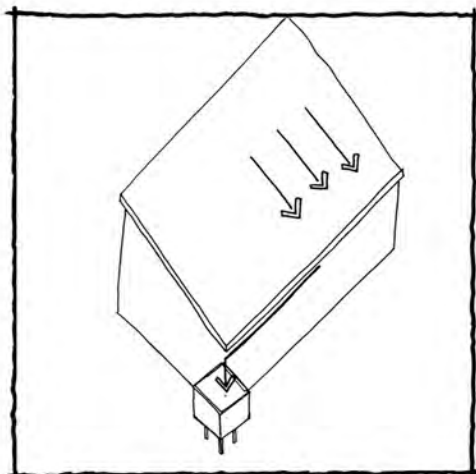


Analyzing the type of space will also determine the kind of activity most suited for that place. In the case of a public space, there needs to be a mutual consent among the residents on the nature of the activity as compared to more private individual space.





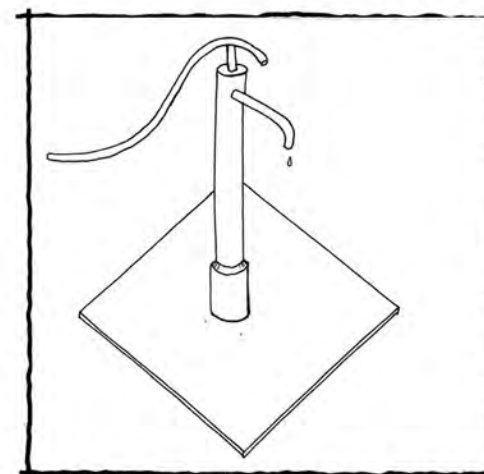
# Where Can Water Be Collected?



Rooftop Collection



Water Bodies



Tap Or Well Source

## Identify A Water Source:

Look around your home and your community in order to determine where you are going to get water for growing. The closer to the garden, the better, however if you have to transport it from a nearby river, that's alright. You can also collect water from your roof, or from the dishes that you wash.

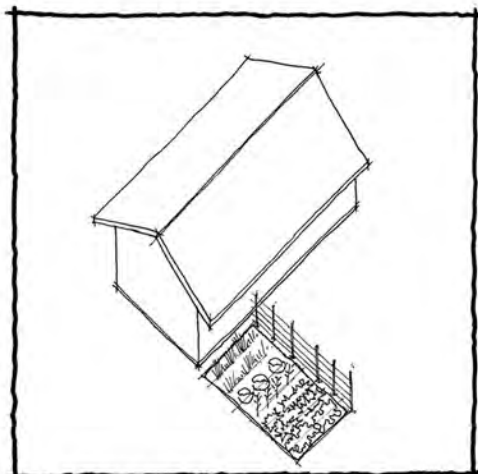


Care needs to be taken that untreated water from toilets and washrooms is not used for irrigation purposes. These types of waste often contain contaminants that can make people sick, especially when used on food that will be eaten raw.

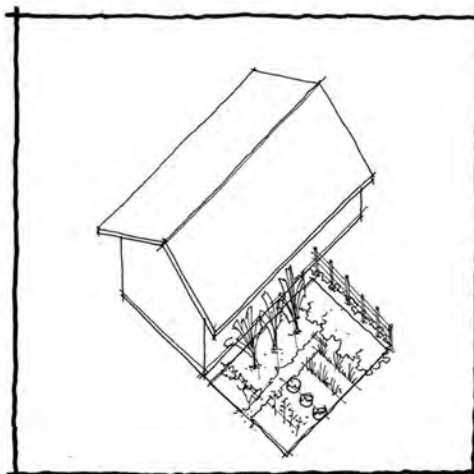




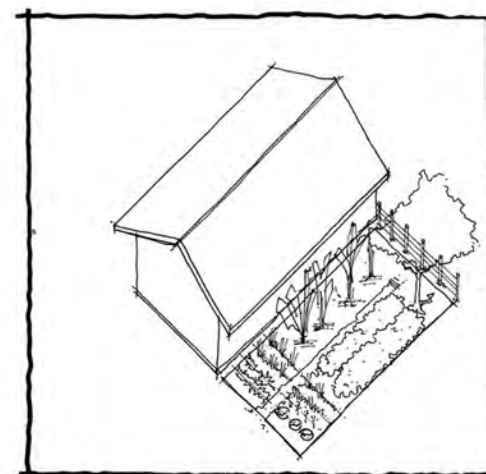
# What Size of Plot is Needed?



Small



Medium



Large

## Plot Size And Space:

See how much space is available and decide if it is a small, medium or large plot size. Look at the shape of the plot as well; is it regular or irregular? This will help you determine what is best suited to grow in this area and how much of a yield you should expect.

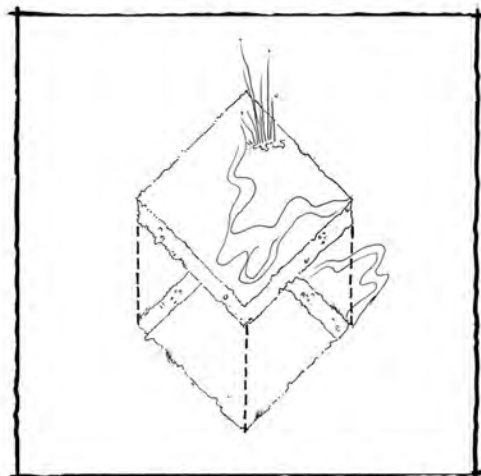


Production in small spaces can be increased by growing plants which do not require much space, as well as using vertical structures to grow on two levels.

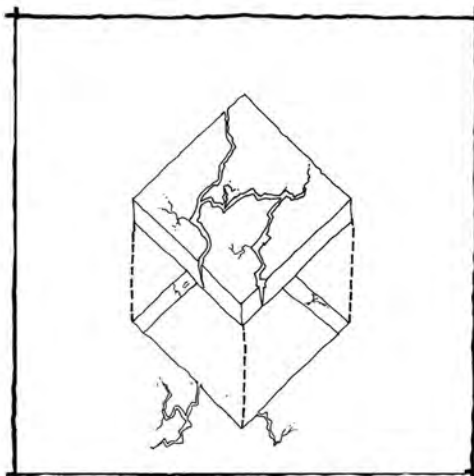




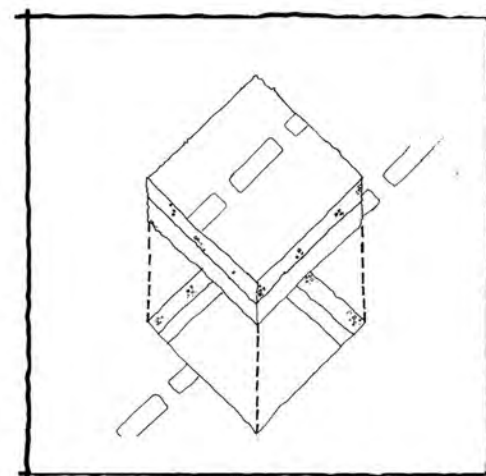
# What is The Ground Like?



Wet



Dry



Paved

## Ground Condition:

Determine what sort of soil you have and whether it is wet or dry, sandy or clayey. You can add animal waste or compost to the soil in order to make it more productive. If you don't have any soil at all, for example in the case of a paved surface, you can fill containers with soil for growing.

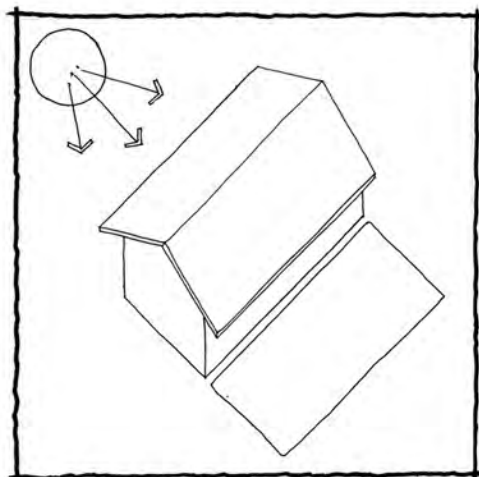


Grasses grow well in clayey soils and help keep dust down during dry periods. Grasses can be as fodder for animals or to hand-weave bags and accessories that could be sold for profit.

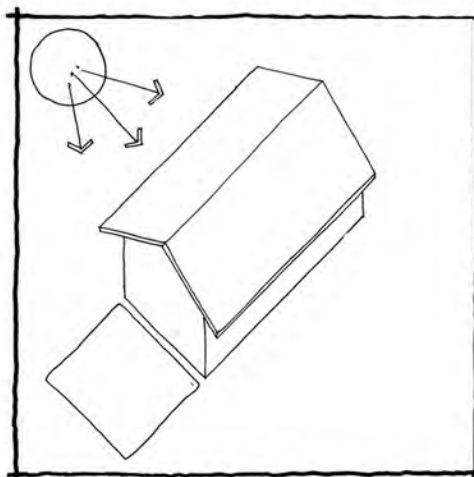




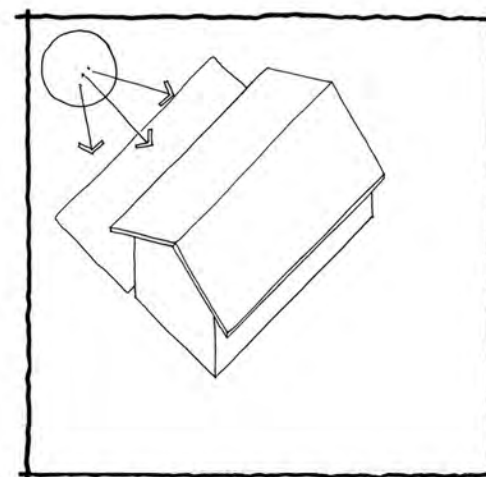
# Where Should the Garden Plot Be?



Shaded



Semi - Sun



Full Sun

## Plot Orientation:

Look up and determine where the sun is in relation to your plot. Depending on the time of year, this will change slightly. By knowing where the sun is and how much exposure your plot gets, you can better choose the plants that will grow well.

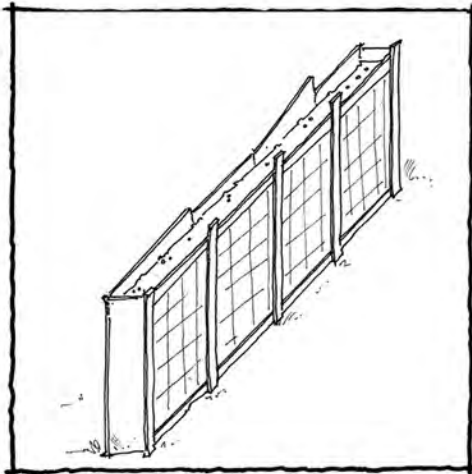


For example, tomatoes are popular plants and require a full sun position. It is important to ensure that they receive water daily in order to produce the best fruit.

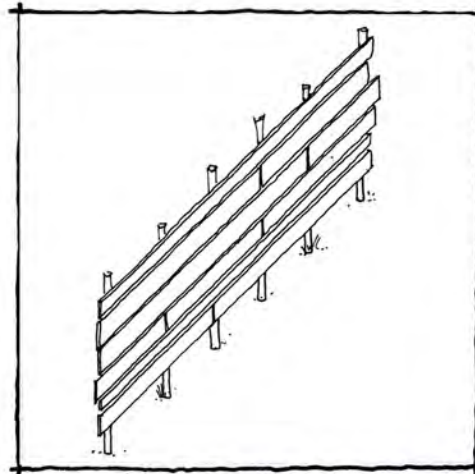




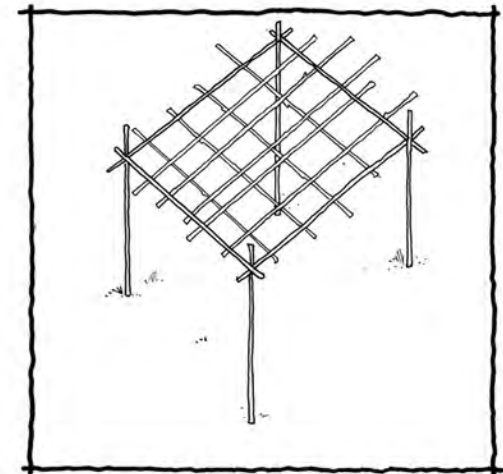
# How Can Space Be Defined?



Growing Wall



Fences



Trellis

## Garden Structures:

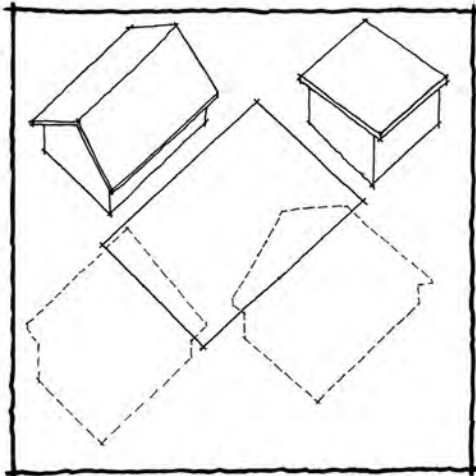
Plants grow at different heights and in a variety of manners. Some require trellises to climb up, fences to lean on, or baskets to hang from. Others can be separated by dividers made of earth, which can serve as growing structures as well.



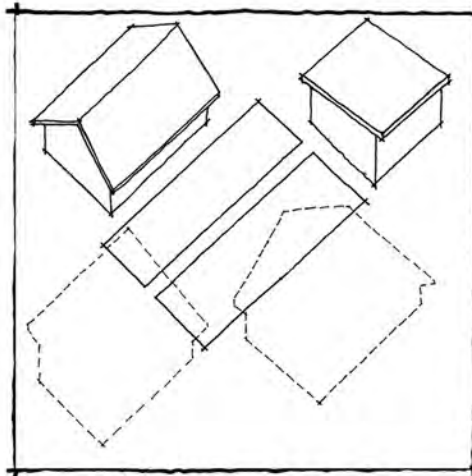
Using trellis for growing can also serve as a semi-covered outdoor room for sitting, selling, or socializing.



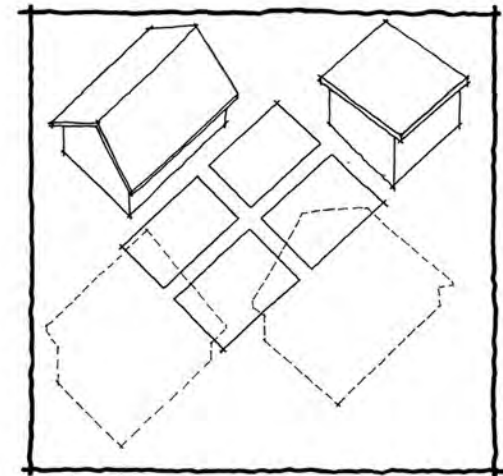
# How Does Circulation Change the Plot?



Outer Edges



Single Division



Multiple Divisions

## Plot Circulation:

If you have a large, shared gardening plot, look at ways of planning the circulation through and around the plot. Try to maximize the growing area and make the circulation the most convenient for everyone. Think about how wide you need your path to be: will it just be for walking or will there be vehicles going through the area?



By avoiding multiple subdivisions, more space can be used for urban agriculture.

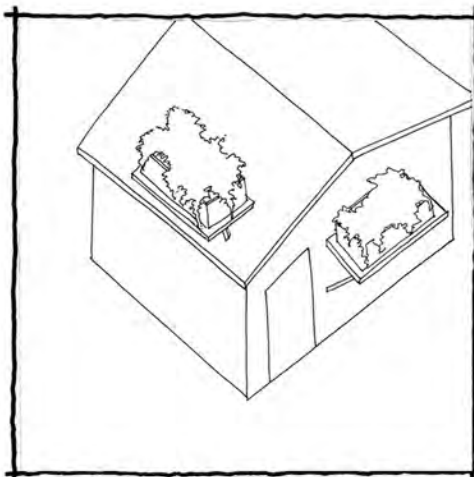




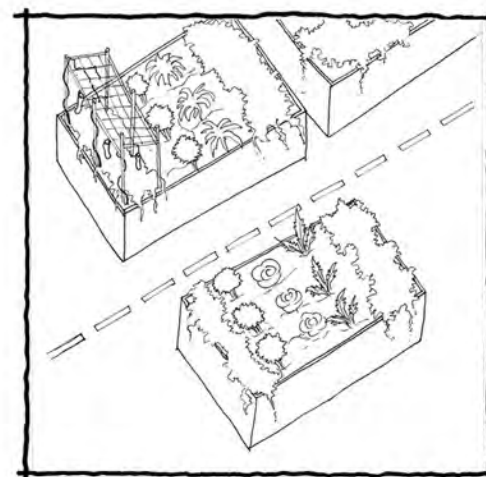
# How Growing can Happen in Difficult Locations?



Small Containers



Medium Containers



Large Containers

## Containers:

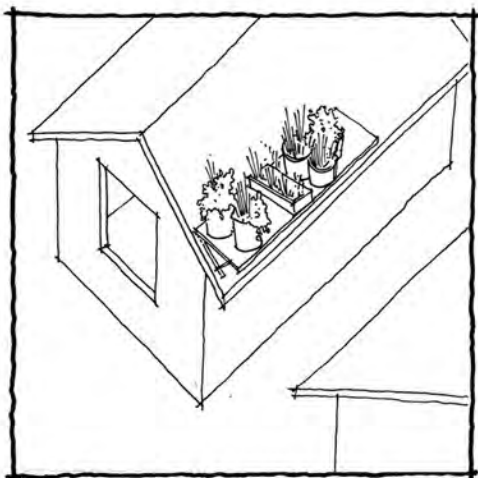
You can use a container if you don't have any available soil or if you want to elevate your plants off the ground. This is particularly good for people who may not be able to bend over to tend to the garden. Small pots can be easily moved around while the growing surface area can be increased by using containers on roof-tops or on wall-shelves.



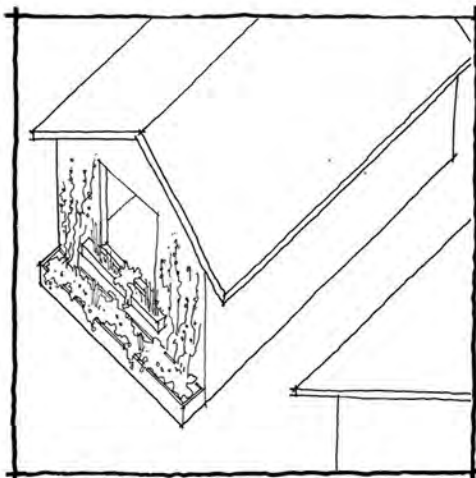
Certain plants like herbs require small space and are more manageable in small containers. However, it must be taken into account that only those plants which do not need a lot of water should be planted in containers, which tend to lose moisture quickly.



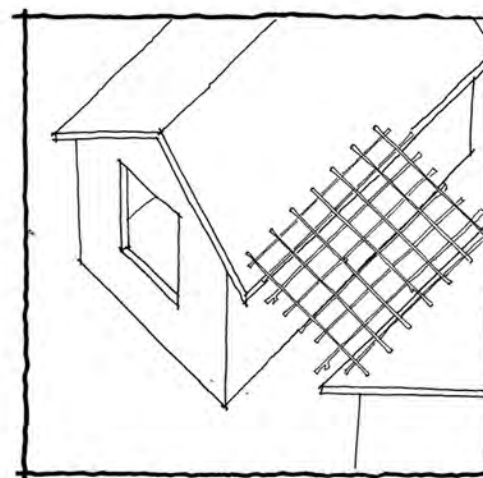
# How can Buildings Be Used for Growing?



Roof Structures



Walls And Planter Boxes



Bridging With Trellis

## Using Buildings:

You can use your home or any other building to grow on. The roof, the walls, window ledges, etc. are great places where extra space can be found. Ensure that the structure is strong enough to support the weight of planters, plants and earth. Shaded spaces can be created between buildings by bridging the roofs with vined trellis.

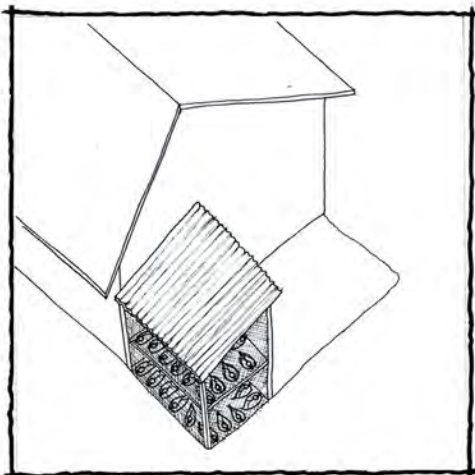


Plant selection is very important when growing in containers. Those plants which do not require much soil or water should be grown in pots and planter boxes. Use vines, creepers or other climbing plants for growing along walls or over trellis.

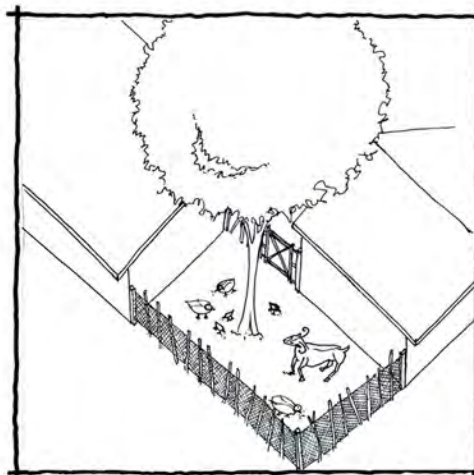




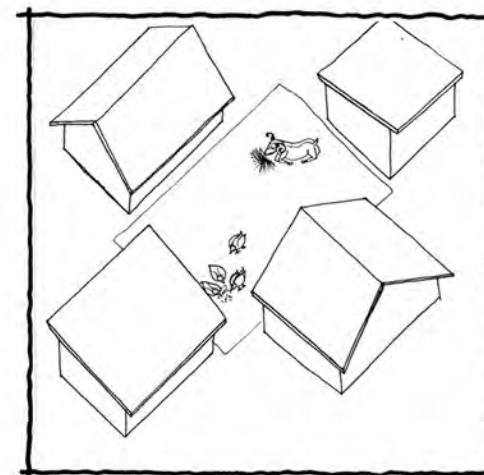
# How Can Animals be Kept in Varied Spaces?



Confined



Semi - Confined



Free Range

## Animals:

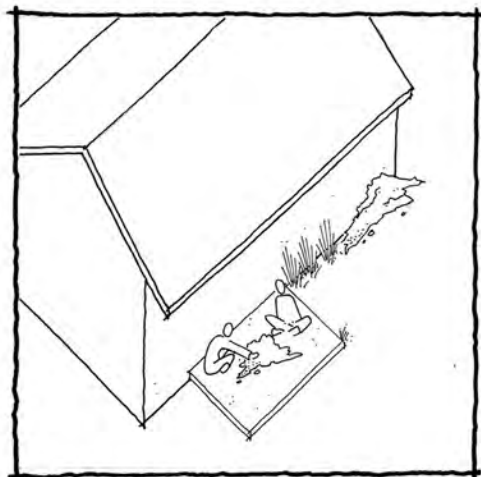
You can benefit from animals in your neighborhood by eating them, using their hides, eating their eggs and using their waste for fertilizer. You have to decide if the animals will be kept in private, semi-private or public spaces. Either they can roam free or be kept in a confined area.



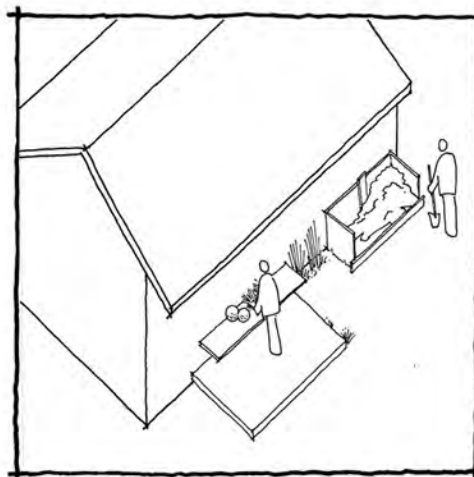
Hens begin laying eggs at 18 to 20 weeks of age and a healthy chicken will lay about one egg per day. A hen does not need a rooster to lay eggs, which are produced in response to daylight patterns.



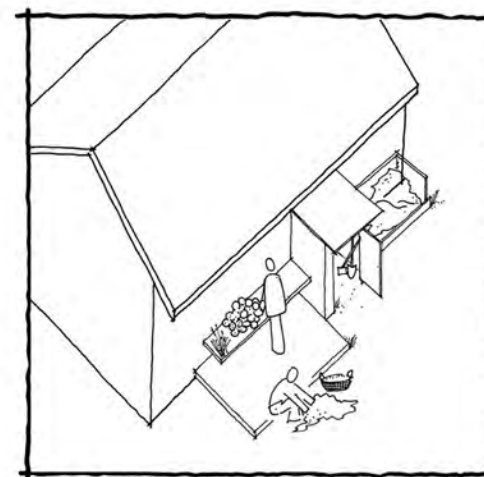
# What Types of Support Spaces can Aid Growing?



Work Area



Compost



Storage

## Accessory Spaces And Structures:

Consider having some shared spaces like a shed, a selling stand or seating benches. A safe place to work, compost, store tools and seeds, and nice places to sit and gather will help make your community garden a productive place.

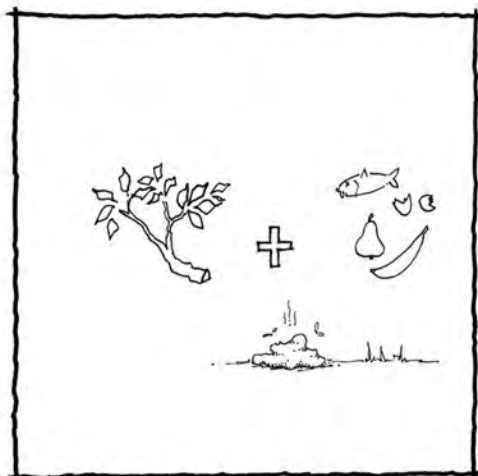


Consider a micro-credit loan from a source such as the Janashakthi Bank Society or Samurdhi to purchase seeds and equipment to start a garden.

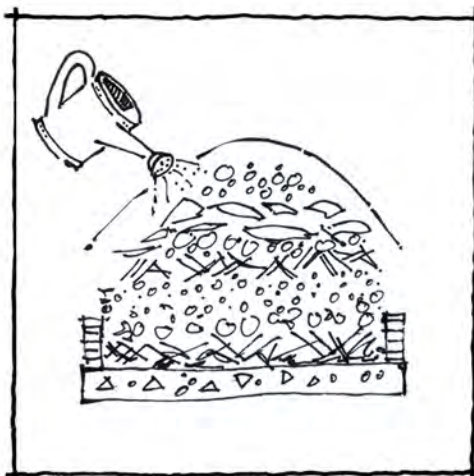




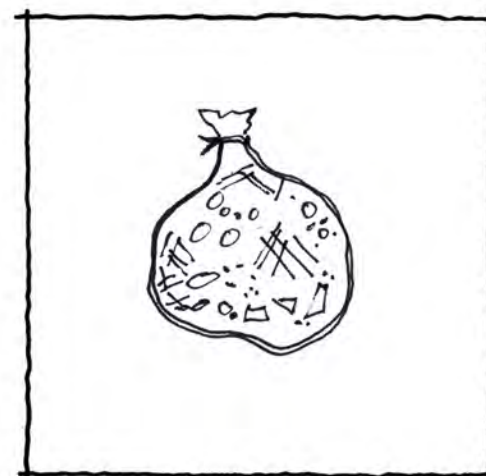
# How can I Use My Waste?



Composting Materials



Pile Composting



Bag Composting

## Compost:

Compost is made from decomposing organic waste, such as fruit, vegetables, cuttings and animal waste. By having a few families pile their waste together in an out of the way corner of a lot, the waste will decompose quickly and can be returned to the garden to enrich the soil.

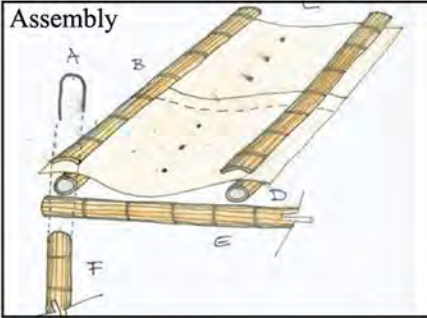


While organic waste can be composted and used as fertilizer, inorganic waste (plastics, metals, etc) can be recycled and sold for money or reused for other purposes like construction, growing, etc



### Tip Box 1: Bamboo Roof Collection

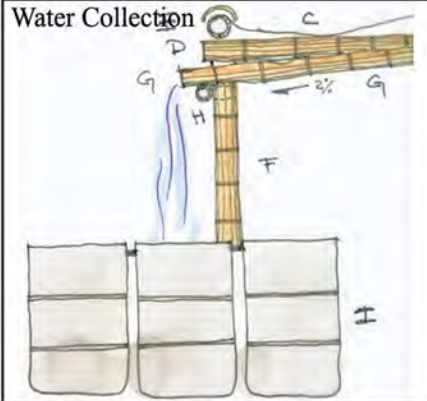
#### Assembly



#### Bamboo



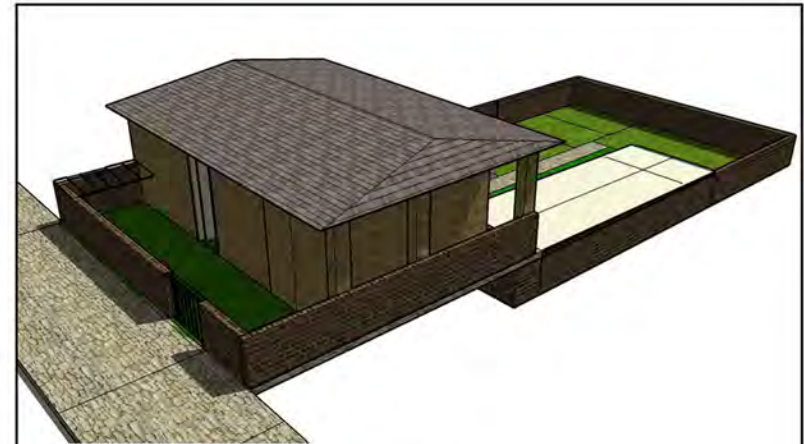
#### Water Collection



Each family is provided with a lot which accommodates a dwelling of 5m x 6m. The rest of the space of the lot is used for home gardening.

Four building materials are proposed for the construction of the houses: earth bag, brick, straw, and tires. These materials are easy to use, thus the local residents can learn how to build their own houses. The low cost of the materials and the self-help techniques to build the dwellings reduce the cost of construction.

The houses are proposed with sloped roofs to facilitate rainwater collection. For more information on how water collection works please look at pages 43 and 47 of this booklet.



Housing Materials and Back Yard Platform

#### EARTH BAG



#### BRICK



#### STRAWS



#### Building Materials



#### TIRE





# Scheme 1: Kampala Site

Two main principles shape this proposal: minimum change of existing situation, and maximum use of space for Urban Agriculture. The minimum change is reflected in the preservation of the existing paths, which are used as circulation network. The current ponds and playground area are also kept and used as public spaces for the community.

The housing lots, which are arranged in forms of clusters, consist of areas ranging from 206m<sup>2</sup> to 229m<sup>2</sup>; likewise, each family is also provided with 80m<sup>2</sup> to 125m<sup>2</sup> of the open communal space. All of these areas, private and shared, have large spaces for livestock and agricultural activities.

The residents are also provided with two marketing areas located at the entrances of the community.

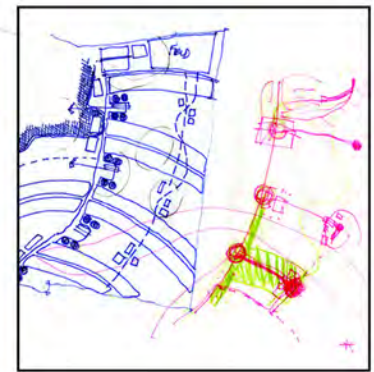
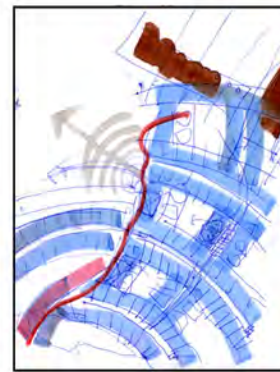
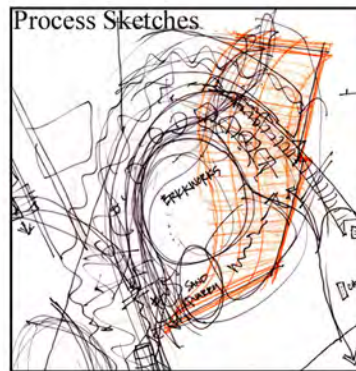
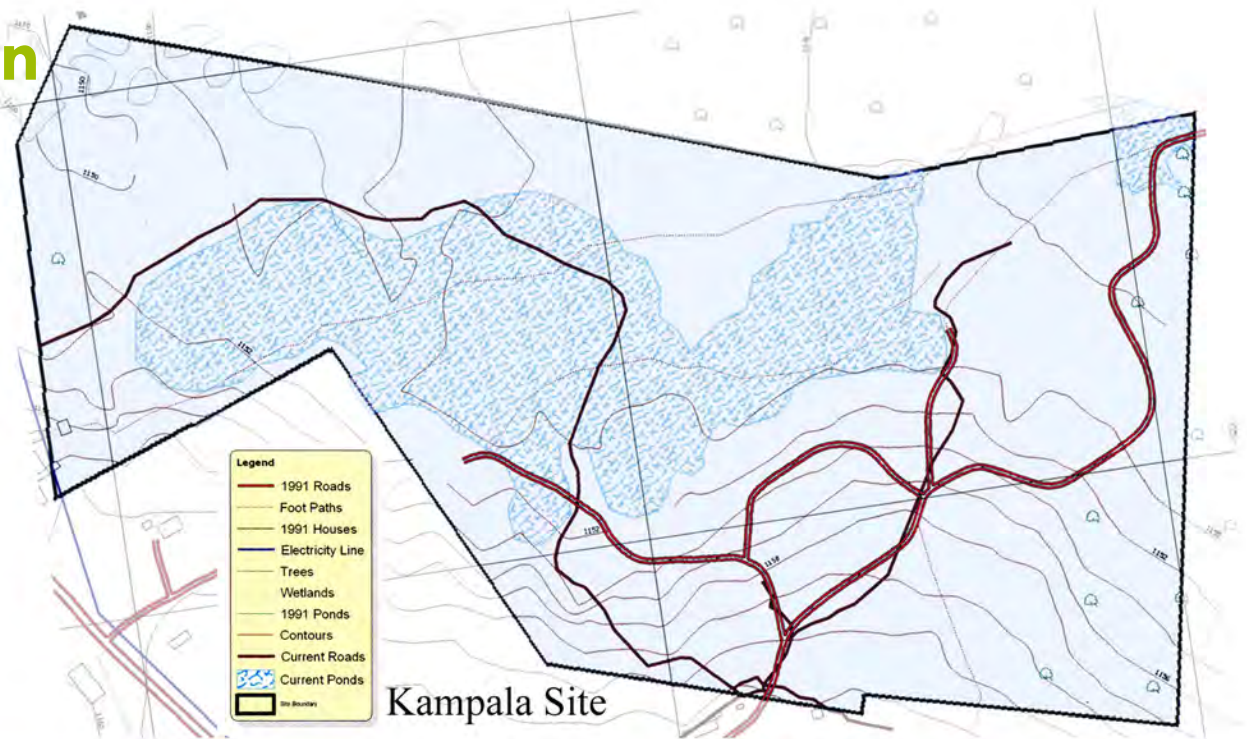




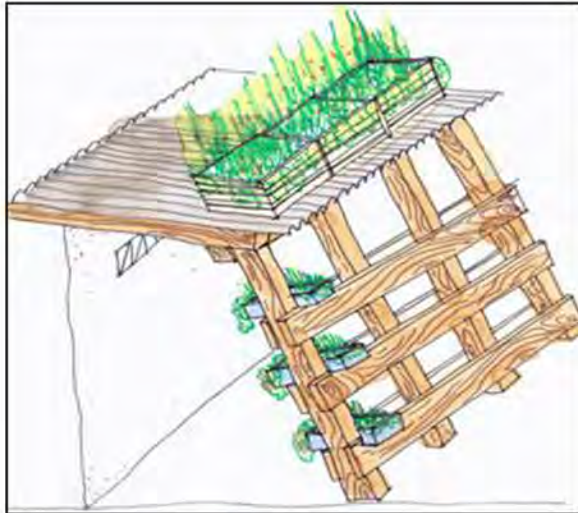
## Part 2: Introduction

The following section consists of two proposals for minimum cost housing for a site in the Walufumbe Zone of Kyanja Parish, in Kampala, Uganda.

The main intention of both proposals is to maximize the use of space for housing as well as for livestock and Urban Agriculture activities as means of income. This way, the residents are provided with private and communal green spaces which are utilized to grow for personal consumption and to generate income by trading and marketing the produce.

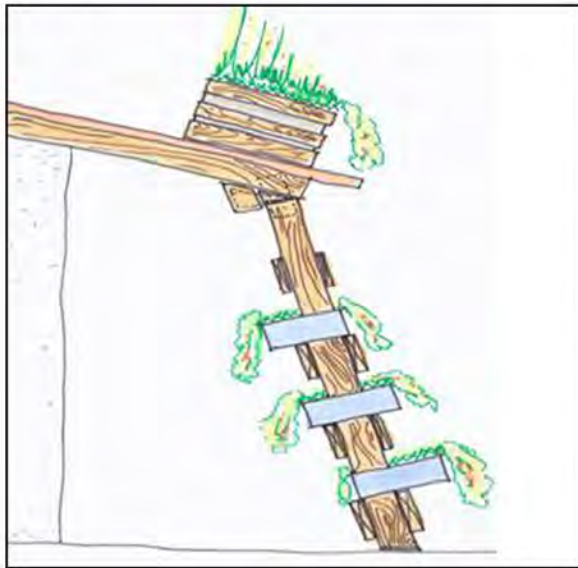




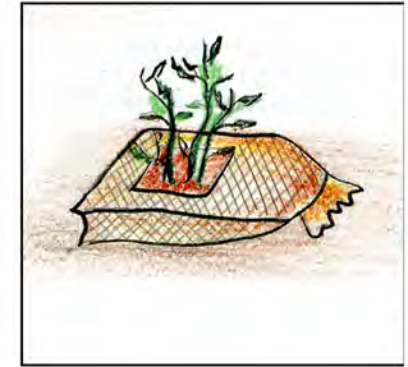
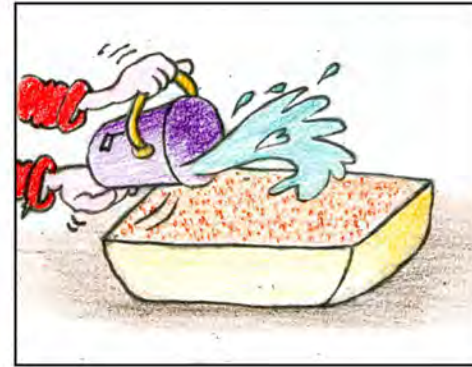


## TRELLIS AND ROOF-TOP GROWING:

Despite the lack of garden space at the home-level, growing can still take place by analyzing the existing space. For example, growing containers can be placed on roof-tops if the existing roof structures are strong enough. Small pots and containers can also be placed on walls and window ledges. Climbing plants can grow on trellis made simply with ropes and wires, while hanging pots and baskets of plants from the roof can also allow growing at multiple levels. In this way, growing can take place even in the absence of a formal garden space with imagination and creativity using inexpensive materials.







### BURLAP GRAIN SACKS:

Grains usually come in sacks made of durable materials such as burlap or polypropylene. These sacks can be recycled and used for growing. To begin with, dig some earth from the ground and fill the sack with soil.

Next, tie the sack at its open end firmly with a rope. Fill with soil and water the sack followed by cutting a hole in the middle for growing. Seeds or cuttings can be placed in the medium creating a useful and easily movable plant container.

### TIRE CONTAINERS:

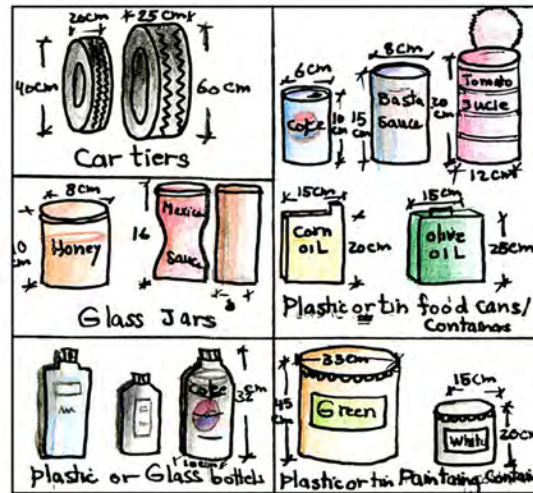
Old tires can also be easily used as containers for gardening. The growing surface area of the tire containers can be increased by slicing off the top part of the tire. Fill the remaining part with loose soil and the tire container is ready to use.





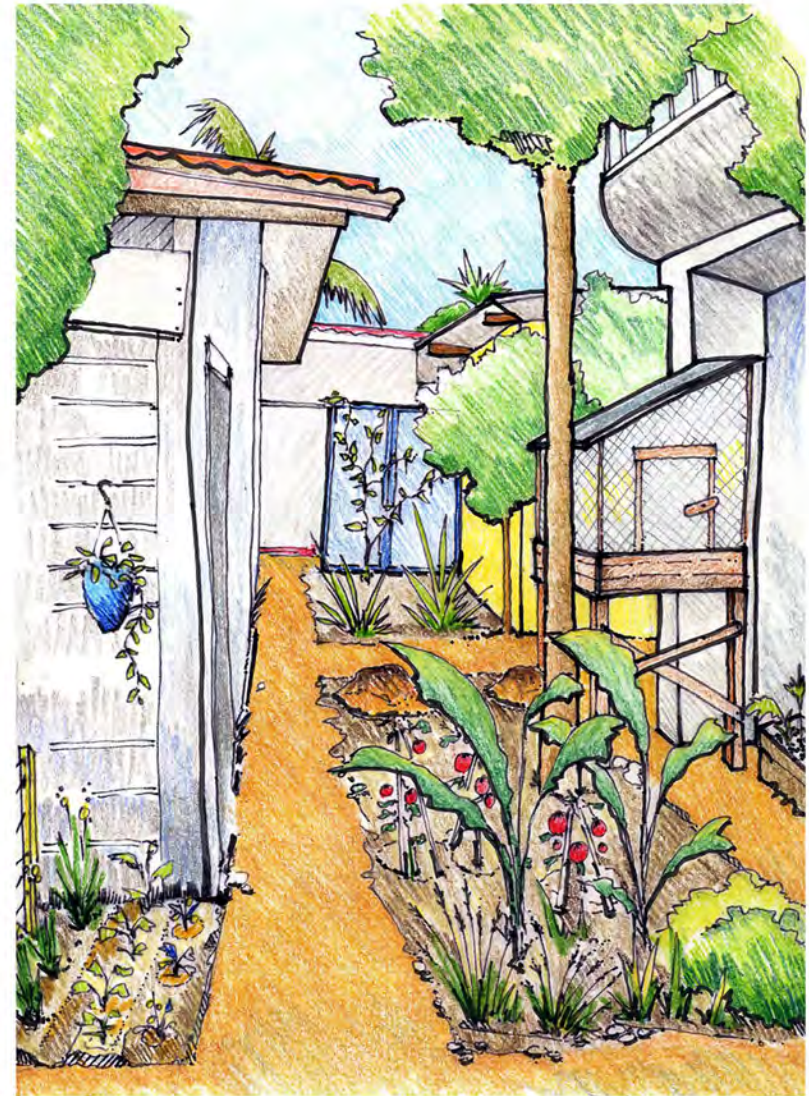
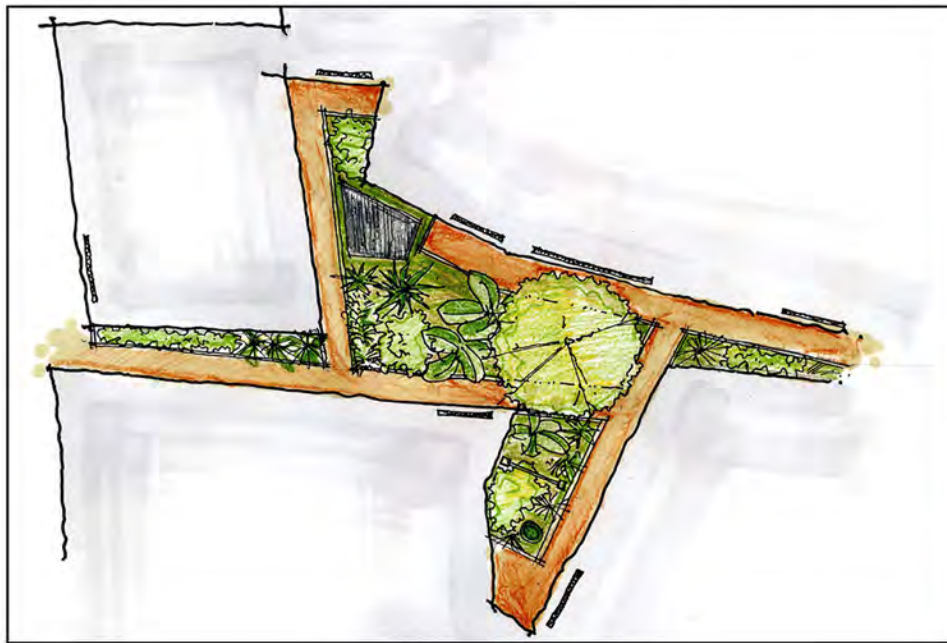
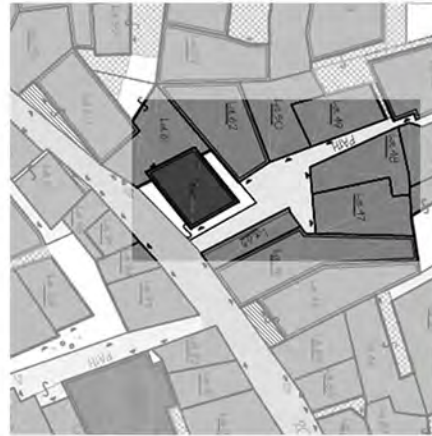
# Housing Level: Introduction

Open spaces for growing at the home level are mostly limited or even non-existent especially in the case of existing settlements. This section looks at low-cost growing innovations in situations where the ground is either restricted or unavailable. Growing without access to land is proposed using soil containers made of waste materials, such as tin cans, plastic or glass bottles and jars, packing materials, plastic bags, burlap grain sacks, and so on. Container gardening can also be useful in cases where the available soil is either contaminated or infertile. The techniques do not require any special skills and can be easily adapted at the home level.



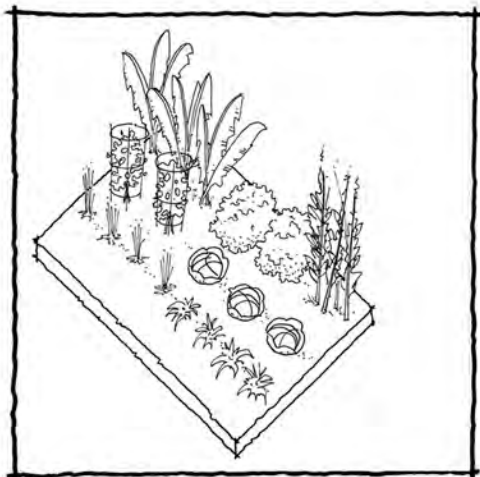


The patterns are applied to an open space present within a cluster of houses in Colombo's Halgaha Kambura settlement as a conclusion to this section. This is to present to the residents the concept of Cluster Gardening in an existing familiar space within their settlement.

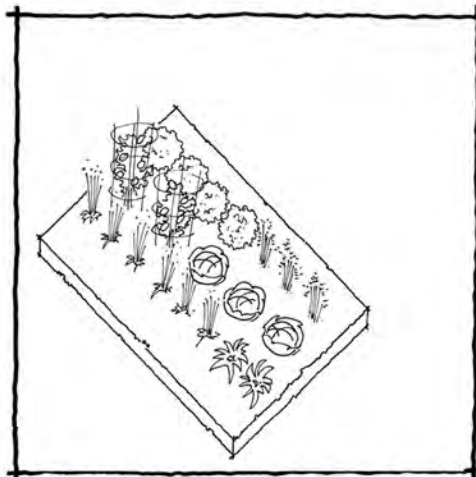




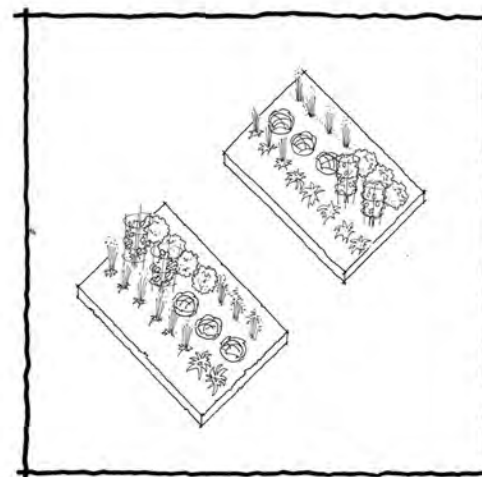
# How can Production be Maximized?



Plant Orientation



Plant Variation



Plant Rotation

## Plot Organization:

Tall plants should not shade the smaller plants. A mix of trees, bushes, shrubs, herbs, vines, hanging plants and root vegetables should be planted. This helps produce a healthy variety of food for consumption and improves the overall biodiversity of the area.

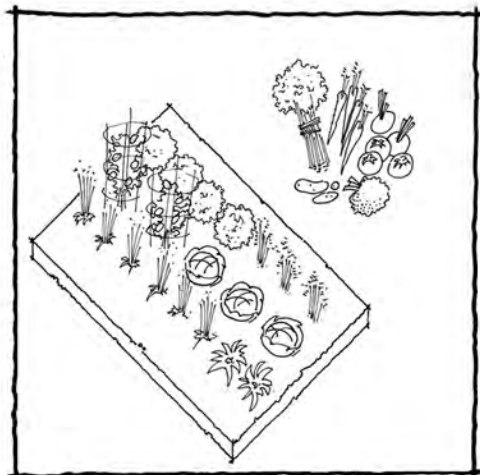
After every growing season, rotating the location of these plants will help them grow better from year to year.



It is important to regularly use fertilizers to replenish the soil with essential nutrients necessary for the healthy nurturing of plants. Consider composting organic waste materials generated within the settlement which produces free high-quality organic fertilizer while taking care of the garbage.



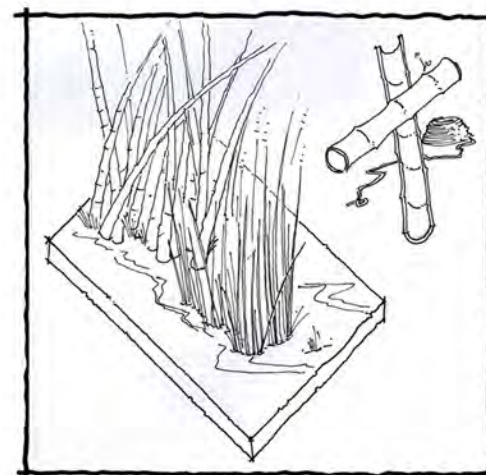
# What Types of Plants can I Grow?



Edible Plants



Sellable Plants



Building Materials

## Agriculture Types:

There are many other things that you can grow besides food. Flowers, herbs, medicinal plants, wood and vines can be sold, used for construction or for separating plots. Think diversely and creatively.



Not every person can grow all the plant types due to lack of space and resources. Exchange of produce among the growers can allow access to different varieties of plants at no cost.



Edible Landscape Tools





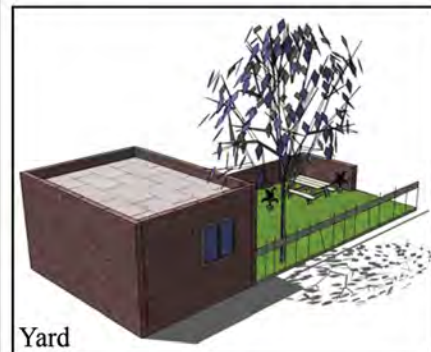
The topography of the site shapes the design of the houses, allowing for a shelter for livestock and growing located at the lower level of the house lot. The platform formed above the shelter offers an opportunity for future expansion of the house.

Six alternatives are suggested for growing at the house level, depending on the space and resources available. The most common are the backyard and front yard areas, walls, fences, roofs and lastly, the interior of the houses.

Large scale livestock, such as goats and cows, is recommended for the open areas located within the cluster of houses. This can result in a more marketable production of milk, meat and fibre.

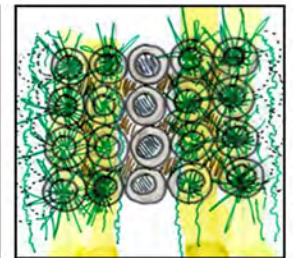
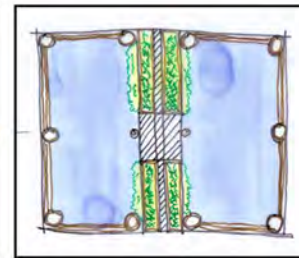
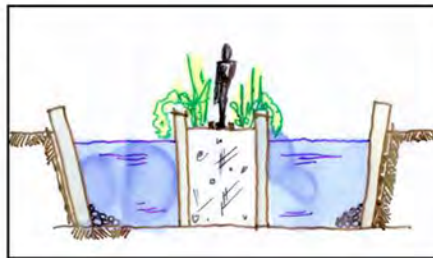
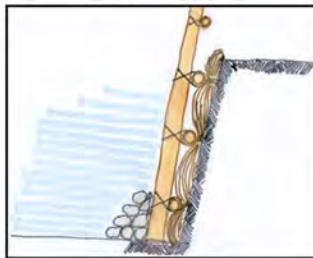
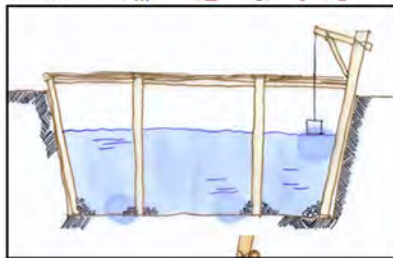
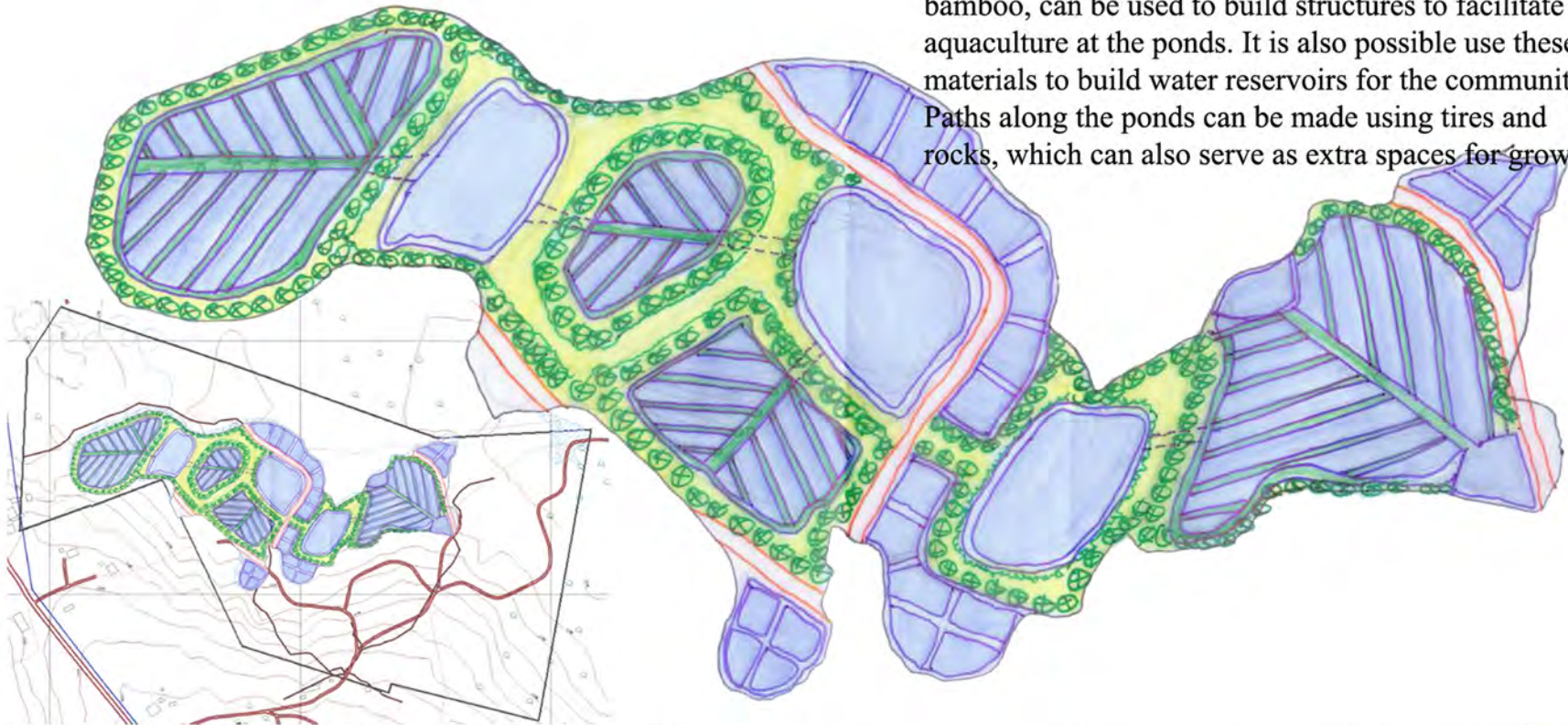


Box 2: Productive House





Inexpensive materials, such as straws, wood, and bamboo, can be used to build structures to facilitate aquaculture at the ponds. It is also possible use these materials to build water reservoirs for the community. Paths along the ponds can be made using tires and rocks, which can also serve as extra spaces for growing.





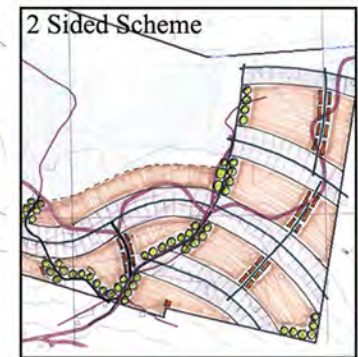
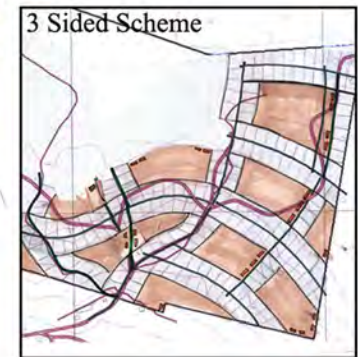
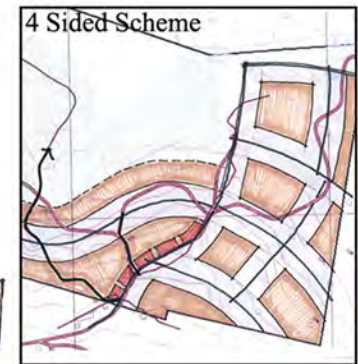
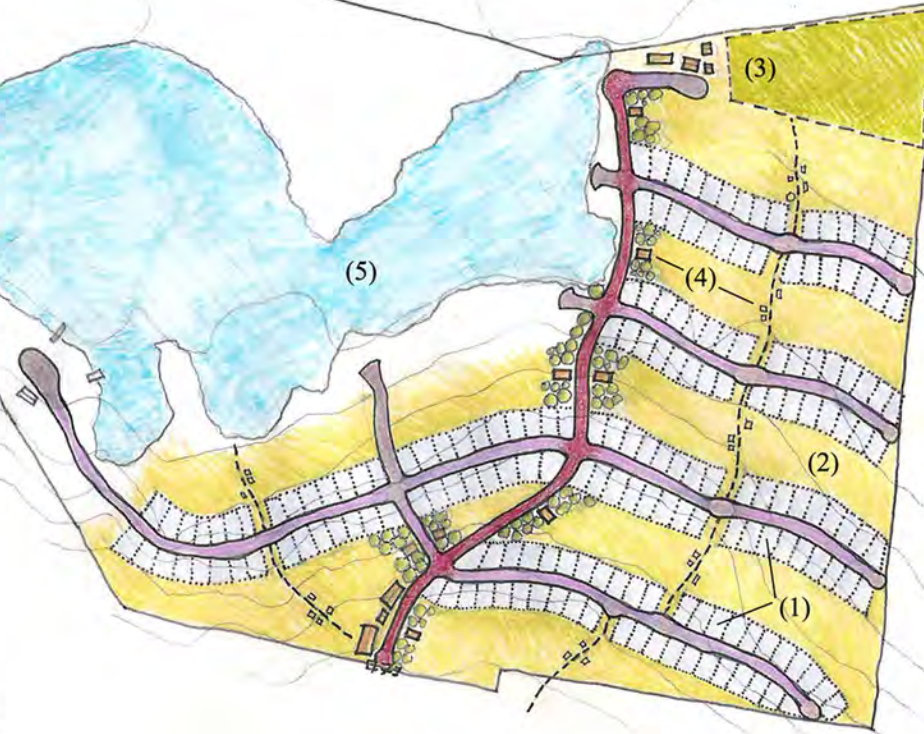
## Scheme 2: Kampala Site

This proposal focuses on housing and gardening arrangements that offer different levels of opportunities for urban agriculture.

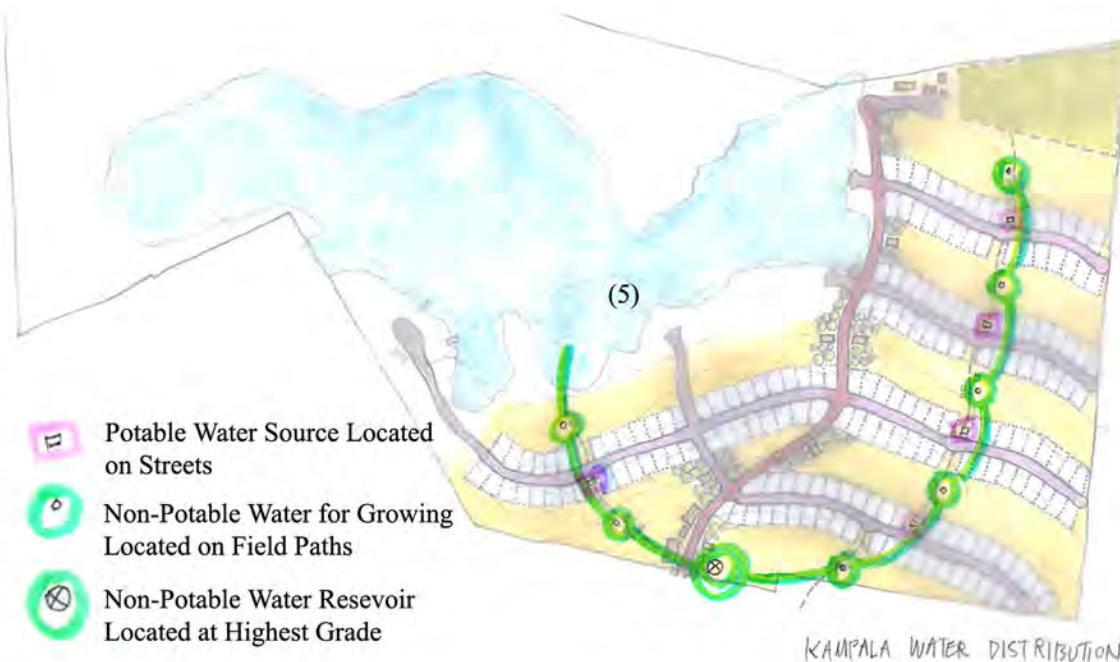
The lots (1) are proposed in a sequence of strips, which follow the existing paths present on site. Each family is provided with a 200m<sup>2</sup> lot divided into two parts; 100m<sup>2</sup> is proposed for the house and private gardens, and the remaining 100m<sup>2</sup> forms a part of the larger shared space located at the back of each strip of lots (2). This communal space is proposed for large scale marketable crop production.

The space currently occupied by a football field is maintained and integrated with a community and health center in the proposal because of its strategic location (3).

Working and collection areas are located at each side of the strips and at the edges of the main street as well as at the field paths (4).





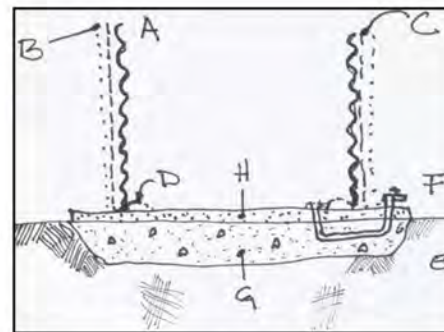
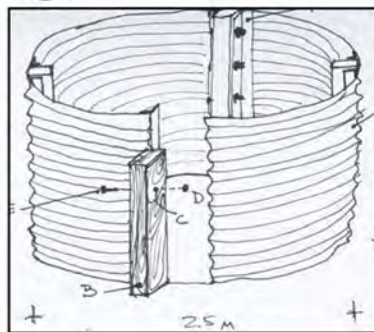
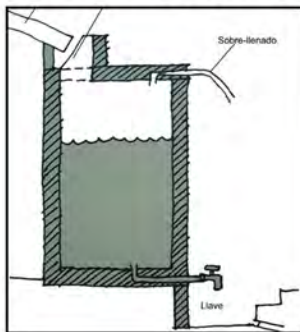


Water from the existing ponds (5) can be used to benefit on-site Urban Agriculture activities. This water is brought to storage reservoirs, located at the highest grade of the land, which is then distributed to water supplies at the field paths for easy access to the cropping areas.

The reservoirs or tanks can be easily constructed by the residents themselves with locally available materials, such as metal, plastic, brick, and concrete.

Potable water is also provided to the residents, through communal water taps located at the center of each block.

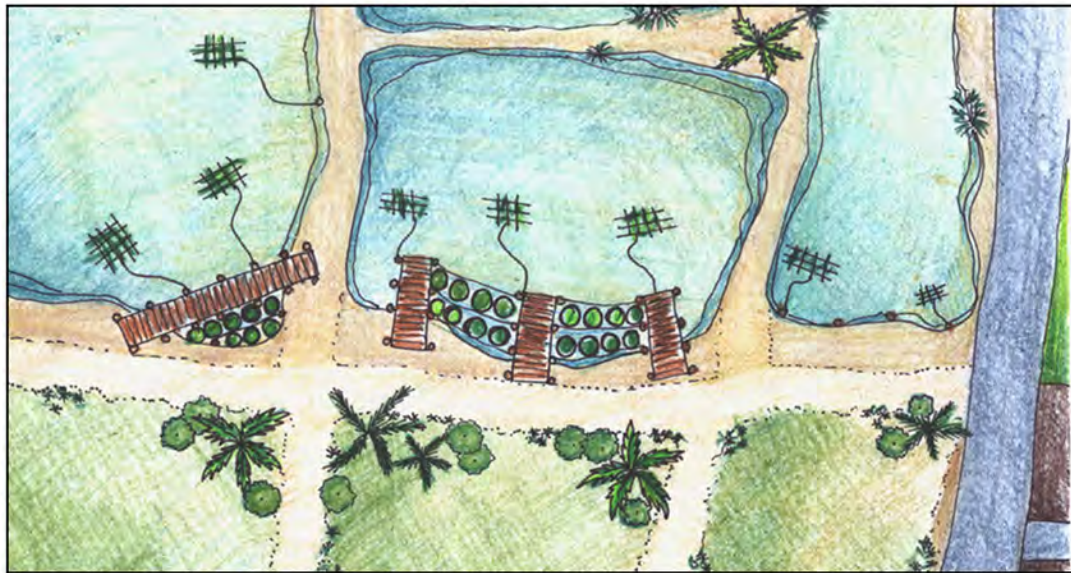
### Box 3: Water Storage





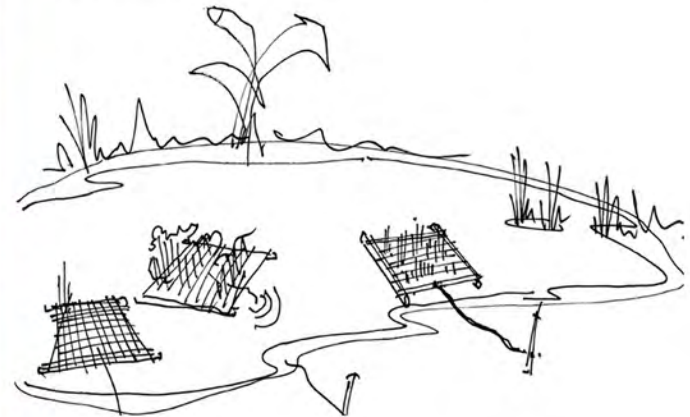


Location Detail

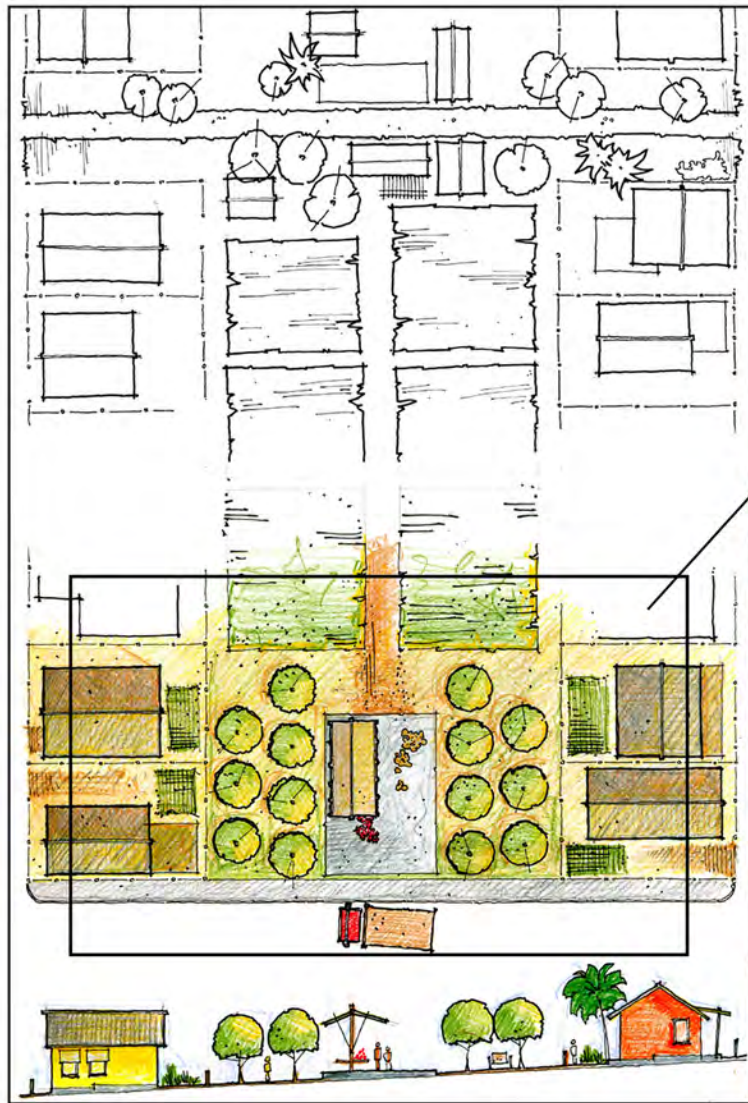


The ponds are also a great resource for fishing and growing. Ponds can be made accessible for fishing by building projected platforms along the edges. Aquaculture is ideal for these ponds as well, and simple tools can be used as growing aids, such as rafts and baskets. The rafts are easy to make and can be assembled by the users with locally available materials. Baskets can also be used for growing aquatic plant species in these ponds and can be held in place using ropes.

The area between the house lots and the adjacent ponds provides safety to the pond area. Plants that do not require much maintenance, such as bamboo or fruit trees, can be planted in these areas.

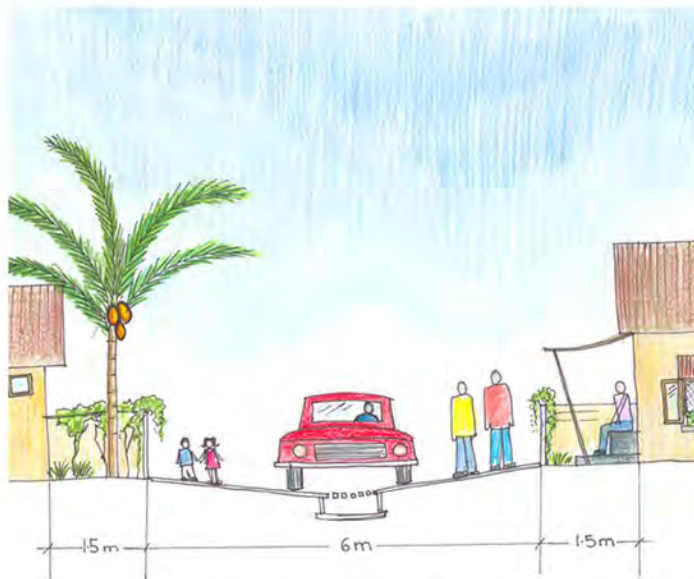






Edible Landscape Tools

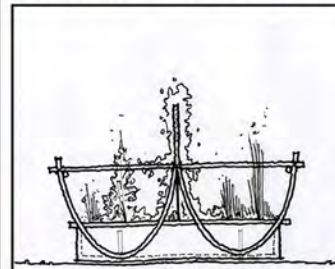




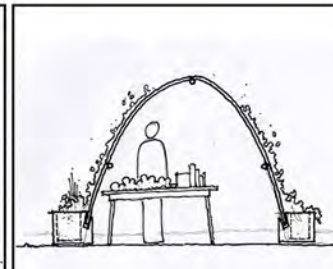
Five designs for dwelling units are proposed, each providing for different necessities of the residents. These units vary in their sizes and interior design, but keep a constant criterion that allows them to have enough exterior space to grow.

Other constants for the layout of the lots, besides the front area that offers space for growing and selling, are an orchard at the back, an exterior vault toilet, a side corridor that separates the houses and allows for water collection, and a back access to the cropping area.

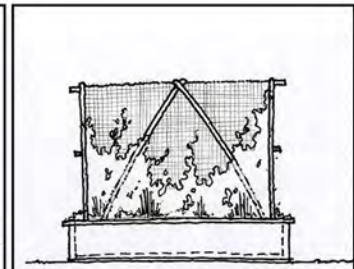
#### Box 4: Productive Streets



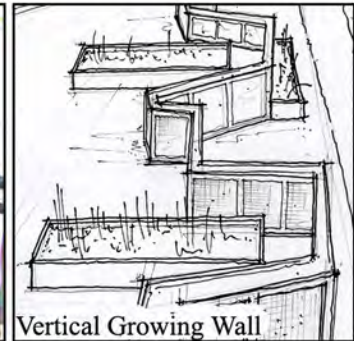
Raised Bed with Reed Trellis



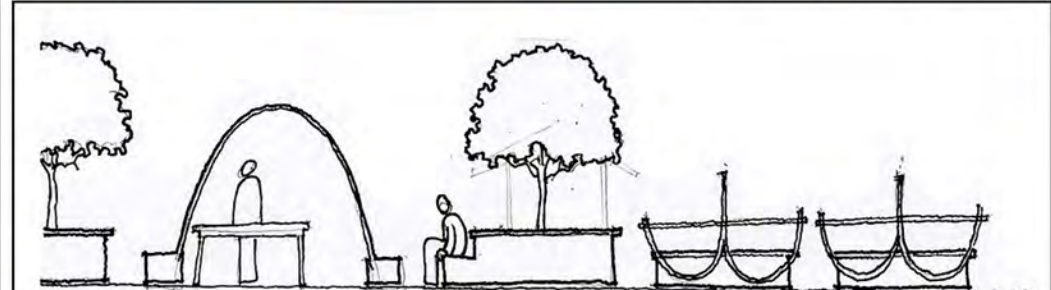
Bent Reed Shelter



Bent Reed Shelter



Vertical Growing Wall



Productive Street Elevation

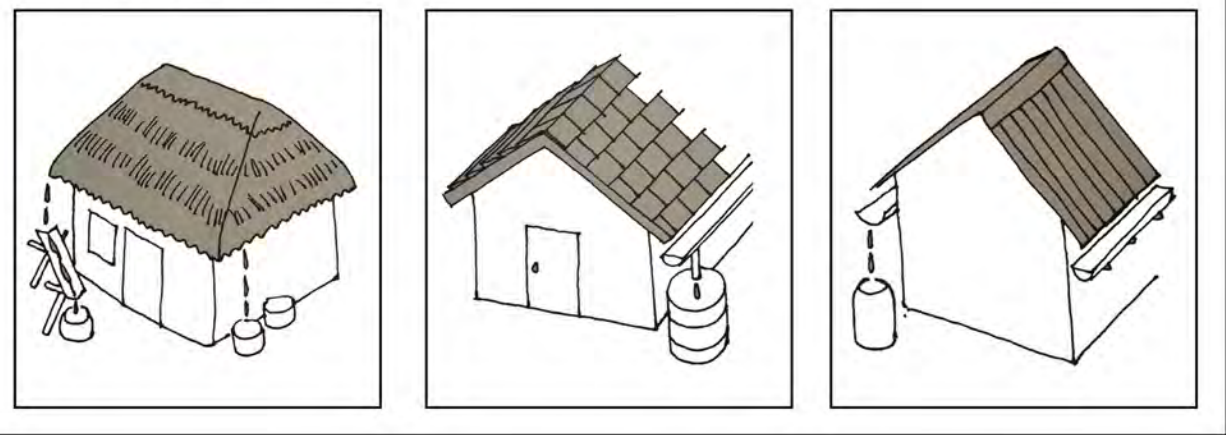






The particular design of the residential streets and the layout of the housing lots allow for productive and market spaces. A minimum of 1.50m. setback is recommended as a bylaw between houses and streets. The width of the streets and setback of the houses from the lot limits give space and freedom to the residents to set up stores in front of their homes. In this way, the streets can become personal growing areas as well as income generating spaces.

Box 5: Water Collection







Making the Edible Landscape project is extended over a span of three years with an aim to provide food security and additional income to low-cost settlements in Colombo, Kampala, and Rosario. By integrating Urban Agriculture in upgrading and development projects in these cities, the project aims at encouraging local residents in adopting agricultural practices on a regular basis. The Minimum Cost Housing Group at McGill University is an active participant of this project, which has also been included in the curriculum of the Master's Degree Program. The first group of graduate students ventured on this project in the semester of Fall 2004 and continued through the following Winter semester with the feedback received from the local teams.







The work realized during the Winter semester advanced the ideas further and was researched to address specific local concerns.

This catalogue documents the second stage of the graduate students' work and for it to be transferred to the following MCHG students as a future reference.

This continuous process of exploring and learning in Urban Agriculture is anticipated to be advanced to the next level by the new group of students. It is hoped that this catalogue is one of many more compilations of students' works to come, serving as resources for Urban Agriculture enthusiasts.







Graphic Layout and Text in this Document Organized by: Nicholas Vreeland  
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June 2006 layout: Karla Segura Fuentes

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