



# A GUIDE TO URBAN / HOME GARDENING



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**Urban agriculture** refers to “growing, processing and distribution of food crops and animal products, by and for the local community, within an urban environment.

Urban agriculture exist in many forms including: community and backyard gardens; rooftop and balcony gardening; growing in vacant lots, right-of-ways, and parks; container gardening; aquaculture; hydroponics; fruit trees and orchards; market farms; raising livestock and beekeeping.

Urban agriculture also involves post-harvest activities such as creating value-added products in community kitchens, marketing crops and products and addressing food waste.

It is simply the techniques and approaches of growing various plant types (vegetables, herbs, spices, rootcrops, fruits) in the city, densely or highly populated towns, apartments, homes, and other areas with little or limited land space.

## Urban Agriculture Production Strategies

### 1. Edible Landscaping

It is simply the art (aesthetic way) and science of crop production. It may find similarities in vegetable gardening, backyard gardening or orchard growing, but with an added design component and usually situated in strategic location. Plots can be of any form required by the design specification. It follows elements and principles of design while enhancing the value of traditional and new methods of crop production suitable for small spaces and urban areas. It utilizes vegetables, herbs, and fruit crops as major softscape materials.

### 2. Container Gardening

This is a micro model farming where a family unit or household is producing fruits and vegetables in special containers for personal consumption to help improve the income, health and well-being of its family members (Deveza and Holmer, 2002)

### 3. Vertical Gardening

A special kind of urban gardening suitable for small spaces, particularly for decorating the walls and roofs in various styles. It is an alternative method for gardening by expanding the scope of growing plants in a vertical space.



# URBAN AGRICULTURE

## 4. Squarefoot Gardening

A simple method of creating small, orderly, and highly productive kitchen gardens.

## 5. Hydroponics

A method of growing food using mineral nutrient solutions in water without soil (soilless based)

## 6. Aquaponics

A bio-system that incorporates recirculated aquaculture (fish farming) with hydroponic vegetable and herbs production to create symbiotic relationships between the plants and the fish. The symbiosis is achieved using the nutrient-rich waste from fish tanks to "fertilize" hydroponic production beds. In turn, the hydroponic beds also function as bio-filters that remove gases, acids, and chemicals, such as ammonia, nitrates, and phosphates, from the water.

## 7. Aeroponics

An integration of aquaculture (fish farming) with hydroponics. Creates symbiotic relationships between the plants and the fish; it uses the nutrient-rich waste from fish tanks to "fertilize" hydroponics production beds; and hydroponic bed cleans water for fish habitat.

Source: ATI-CAR Urban Agriculture Module by Dr. Cristine Esnara



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# EDIBLE LANDSCAPING

## for Urban and Home Gardening

**E**dible landscaping (EL) is an important component of urban gardening. It is an innovative concept of combining various principles of landscape design with existing technologies for small-scale crop production. It utilizes vegetables, herbs, and fruit crops as major softscape materials.

EL is not just about crop production but has a complex activity of planning, design, implementation, and maintenance, as similarly done in conventional landscaping. It has an added design component and usually situated in strategic location. Plots can be of any form required by the design specification. Fruit trees can also be intercropped with other edible crops and can be planted at various spacing in accordance with the design.



### Components of Edible Landscaping for Small Scale Production

1. Softscape – Technically, the plants used in edible landscaping are called “soft scape”. These include fruit trees, vegetables, cereals, herbs, and medicinal plants, all of which serve as screens, accents, hedges, and ground covers in the landscape.
2. Hardscapes - These are non-living components which can be immobile or mobile and aid in achieving the function of the space. Examples of Hardscape includes containers, trellis and other structures. This enhances the edible landscape garden and enables the space to be aesthetically attractive even when crops are absent.
3. Landscape - The major part of an edible landscape. The success of the whole project depend much on this component. Landscaping should not only focus on the aesthetic value of each elements but should also consider to maximize the utilization of the area to meet the optimum crop requirement for improved yield
4. Crop Production - Good crop production system is needed to improve the yield. Thus, select crop production techniques that would improve the yield and suited to the characteristics of the chosen space. Crops selected must be adaptable and have the ability to thrive at the site. If site is the limiting factor, then both the landscape and crop production component must be carefully designed to maximize the positive characteristics of the site and incorporate various production techniques.

# EDIBLE LANDSCAPING

## for Urban and Home Gardening

### Elements to Consider

1. Form/shape. This refer to the shape of the area and the plants used as soft-scape. Site may vary from round, rectangular or square in shape. There are plants that looks upright, spreading, rounded, etc.
2. Size. Site and plant varies in different sizes.
3. Color. Try to consider different colors of soft-scape materials.
4. Line. This will depend on the shape and form of the site.
5. Texture/feel/organization

### Three (3) Principles of Design

1. Balance. For better production, design must be balance where all parts may have enough sunlight, air, water, etc.
2. Contrast. There has to be a degree of difference in the treatment of different elements. Design in such a way that every part is highlighted.
3. Harmony. A pleasing relationship between all the different parts of a design making each object or component a part of the unified whole
4. Scale and Proportion. The Design must give a sensation of bigness or smallness within a space.



### Maintenance of Crops

Organic farming should be followed in EL that promotes the use of natural organic sources as inputs in food production

Composting of garden and kitchen wastes is encouraged and the compost is added to the soil to enhance its fertility. Compost can be produced through different methods such as vermicomposting.

Watering. The growing medium should never be allowed to dry out completely, and plants should never be allowed to wilt. Watering plants in containers requires more attention than plants in the field because plants in containers dry out faster due to limited amount of growing medium, especially when the containers are located on solid paving surfaces in direct sunlight.

# EDIBLE LANDSCAPING

## for Urban and Home Gardening

### Practice Integrated Pest Management

- Manual weeding and removal of infected plants of infected plants
- Pruning of old and infected leaves
- Fruit bagging to protect fruit vegetables like the ampalaya
- Companion planting can also be a pest management practice.
- Relay cropping where crops are not planted in the same area in the next cropping season.
- Intercropping and crop rotation is also encouraged to improve soil fertility at the same time manage pests and diseases.
- Repellent plants such as onion, garlic, and marigold are commonly used in companion planting to repel insect pests.
- Use of traps such as small pieces of yellow board smeared with grease can be placed among the plants to attract and catch insects in the garden.

### Advantages of Edible Landscaping

- Better quality and safe food. The nutrient content and flavor fresh vegetables is high just after harvest.
- Higher return on investment. A traditional ornamental landscape only provides aesthetic appeal, edible landscape will provide food and profit.
- Increased food security. Growing your own food reduces your reliance on imported food sources.
- Lower food costs. Certain crops are more economical to grow at home than to buy. Save grocery bills.
- More accessible produce. Convenience of food right outside your door.

Source: ATI-CAR Module on Urban Agriculture by Dr. Cristine B. Esnara

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# CONTAINER GARDENING

## for Urban and Home Gardening

**C**ontainer Gardening is a micro model farming where a family unit or household is producing fruits and vegetables in special containers for personal consumption to help improve the income, health and well-being of its family members (Deveza and Holmer, 2002).

It aims to offer accessibility and affordability of fresh and highly nutritious vegetables for family consumption.



### Tips in Establishing Container Garden

1. Location. Sunlight is very important in growing healthy crops. Any location will do as long as it has an access to at least minimum of 6 hours of sunlight each day, either in the morning or afternoon.
2. Choosing your plant. After choosing the location of the garden, choosing the crops is the next step to decide. As mentioned earlier, choose crops that are locally adapted, high yielding and pest and disease resistant. Consider the number, ages and the nutritional needs of family members as basis in choosing crops to plant in your container.
3. Soil media or soil mixture. Soil medium is one of the key to successful container gardening. Container gardening requires a specific soil mixture to be used. Ordinary garden soil alone may not be sufficient if it lacks the properties necessary for healthy plant growth.

The ideal soil medium must be:

- porous to allow good aeration of the plant roots
- good drainage to minimize the risk of waterlogging and subsequent rotting of plant roots
- dark brown in color and looking much like chocolate cookie crumbs

The ideal growing medium is a mixture of 3 part loam soil, 1 part compost or composted manure and 1 part rice hull or coconut coir dust or washed river sand. Clayey soil requires 3 parts clay soil to 2 parts of compost to 1 part rice hull (or its substitute)

### Tips in Choosing your Containers

The design of the containers to be use must be the manifestation of the design you set, depending on your preference and availability of the materials. If for instance the goal is to showcase the containers, glazed ceramic pots, porcelain pots, plastic pots in all shape and sizes may be used.

# CONTAINER GARDENING

## for Urban and Home Gardening

Indigenous materials available in the locality may be converted into beautifully looking containers such as cut bamboo poles or others. Only your fantasy is setting the limits. If the goal is recycling and finding long-term use of objects that are normally thrown into the garbage, then old tires, sacks, tin cans, plastic containers of mineral water, oil, milk, catsup, and others can be used.

### Seedling Production, Planting, Care and Maintenance

1. Sowing and planting. Quality seedlings means quality plants. Thus, recommended standard operating procedures from soil sterilization of soil media, sowing and raising good planting materials and transplanting techniques should be followed. Small seeds such as pechay, crucifers and lettuces, etc. are usually pricked for easy management.

2. Watering needs. Watering should be done regularly especially during the dry season. It should be done early in the morning or at least 3-5 in the afternoon. During rainy season when plants receive enough water from the rain, there might be not need to water the containers at all. If the weather is not too hot, watering once in the morning is enough for the plants to grow healthily. The hotter and drier, the higher the plant demands for water.



3. Cultivating and weeding. Cultivating the soil at a depth of 2 to 3 inches below the surface of the potting medium will encourage maximum air flow around the roots. This will encourage bigger and healthier root growth and better water and nutrient uptake.

Weeding allows the plants to benefit the nutrients and water that is provided by the medium without having to compete with other non-productive plants. It has to be considered that weeds being native to the environment, usually grow bigger and faster, than cultivated crops.

4. Feeding the plants. Plants need food to grow. The containers may be top dressed with well-composted manure or compost every two weeks. Alternative source can be from rice washings and water used to rinse meat and fish may be used. Instead of throwing them, those can be collected and used to water your plants. Feeding the soil with nutrients means feeding your plants.



# CONTAINER GARDENING

## for Urban and Home Gardening

1. Pest and disease management. Increasing the bio-diversity of the container garden is already a way of preventing the occurrence of pests and diseases. This may be done by growing vegetables from different botanical families including herbals which may act as repellants to certain pests. If there is an occurrence of infestations, appropriate biological, physical, mechanical, and - in severe cases - chemical control measures may be used.
2. Harvesting. Harvest only what you can consume or what you need and harvest during its peak of maturity. This is the beauty of container gardening. Example, vine-ripened tomatoes, tender green beans and crisp lettuce will have the best flavor on its peak of maturity.

At the end of the harvest season, discard the plant and soil from the pot. Do not reuse the same soil for a second season of production. Infected soil or mix will spread disease into the second season unless it is properly composted. Properly composted planting media can be reused.

Source: ATI-CAR Module on Urban Agriculture by Dr. Cristine B. Esnara



# HOUSEHOLD COMPOSTING

for Urban and Home Gardening

## Why Compost at Home?

Composting is a natural process of decomposition that turns garden materials and vegetable food scraps into a dark, crumbly, and earthy smelling material called compost. To some farmers, they call it the “black gold” because it is rich in nutrients and full of life and when used in your garden and on your plants, it feeds the ecosystem of the soil and slowly releases nutrients that plants can absorb.

Using compost is the foundation of maintaining healthy soil for stimulating all plant growth and creating a beautiful garden.



## Recipe for Great Homemade Compost

### 1. Green and Brown Materials

Composting organisms thrive on a balanced diet of green (nitrogen rich and brown (carbon rich) materials. Green materials, such as grass cuttings, provide protein needed for growth and reproduction while browns, such as dried leaves, supply energy.

Most materials from the garden are well balanced enough to be composted all on their own, including old flowers, bush trimmings, old vegetable plants and weeds. The only materials that are too green and wet to be composted on their own are grass cuttings, food scraps and animal manure. On their own they will create a mucky smelly mess. If you want to compost these, they need to be well mixed with materials that are high in carbon such as leaves, straw, bush trimmings, sawdust, wood shavings or shredded paper. Although paper breaks down slowly, it can be used if other materials are not readily available.

### 2. Moisture

All life needs moisture to survive and composting is no different. Too little moisture and the composting organisms die off or go dormant. Too much moisture and the heap can drown and potentially turn slimy in your composter. Anaerobic bacteria, which thrive in the absence of air, can then take over and create a bad smell. Ideally the materials should be moist to help the decomposition which starts on the surface of the materials.

### 3. Aeration

Just as with water, all composting organisms need oxygen. To promote good aeration and therefore good composting:

- Create lots of tiny air pockets by adding stems, stalks, wood chips and other rigid materials. With a good blend of materials and adequate moisture, the heat produced from composting creates a chimney effect, drawing air into the composting materials and promoting air flow through it.

# HOUSEHOLD COMPOSTING

## for Urban and Home Gardening

- Put your composter on a few inches of coarse materials at the bottom. This raises it slightly above the ground and helps air to flow underneath and up through the compost. This also improves drainage from the heap if it gets too wet.
- Do not build the heap too big as larger piles can become compacted and this can squeeze the air pockets from the heap. While smaller heaps will get more air than larger ones, they do not heat up as much.
- Turning your compost regularly helps fluff up and aerate the materials. This helps restore the air spaces needed for the compost to “breathe”. Depending on your energy level and your need for compost, your compost can be turned weekly, monthly, annually or not at all.



#### 4. Particle Size and Surface Area

When it comes to composting, the smaller the particle, the faster it will break down. This is because composting works from the surface of materials inwards. So to speed up composting:

- Chop woody materials up with a sharp spade or shears.
- As you garden, use your pruning shears to cut materials into pieces no longer than 10 cm.
- Run over leaves or weeds with a lawn mower.
- Put woody trimmings through a shredder.

# HOUSEHOLD COMPOSTING

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Chopping materials up helps make a better mix when forming your compost heap. Keeping materials smaller also makes it easier to turn the heap later on for faster composting. Ideally, you want a mix of fine and coarse materials in your heap, for example small green grass clippings with chopped up brown hedge trimmings.

### 5. Size of Heap

While the size of the heap will be determined by the amount of material you have to compost and the system you chose to use, the ideal size is about one cubic meter. A heap of this size can be made with materials accumulated over time (cool composting) or made all at once (hot composting).

When a large heap is made all at once with the optimal conditions for composting – the proper balance of nutrients, air, and water – the breakdown of materials is so rapid, that the compost generates heat and can get as hot as 70°C. Heaps of one cubic meter in size or greater also have an ability to hold heat better because they self-insulate.

### Do compost

#### Greens From the garden:

- Grass cuttings, , garden plants, weeds, potted plants, cut flowers, house plants.
- Weed seeds in your compost heap can be bad news but if maintained properly the heat from the compost will eliminate most of them. The best thing to do is pull out weeds before they go to seed or remove the seed heads before composting.

#### Greens From the Kitchen:

- Vegetable trimmings, fruit peels, cores and rinds, tea bags, coffee grounds and filters, baked goods including bread (in small quantities only), rice and other grains, pasta and cereals, cooked or uncooked vegetables

#### Browns From the garden:

- Leaves, twigs, hedge prunings, shredded tree trimmings, straw or hay, pine needles, cones, bark

#### Brown From the Kitchen:

- Paper towels, paper napkins, uncoated paper plates and cups, soiled cardboard (like pizza boxes) – must be torn up or shredded to be used effectively.

# HOUSEHOLD COMPOSTING

## for Urban and Home Gardening

### Don't Compost

From the Garden:

- Diseased plants, leaves, or insect infested plants
- Invasive weeds that spread by root or runner such as ivy, briars, bindweed, buttercup, dock, thistle
- Timber or large woody materials

From the house:

- Anything animal-based like meat, fish, poultry, dairy (including cheese), oils or grease. This includes bones and shells.
- Vacuum cleaner bags and their contents.
- BBQ and coal ashes.
- Nappies or sanitary towels.
- Dog and cat pet wastes
- Chemicals and pharmaceuticals

### Compost Bins and Compost Heaps

With this form of composting, materials are simply added to the heap, composting area or bin, as they are generated.

The materials that are added in one season are ready as compost for the next. The speed of composting and the quality of the end product can be improved by chopping and mixing materials as they are being added, monitoring and maintaining the proper moisture levels, operating more than one heap or bin at a time and turning the compost regularly.

This type of composting works best if given plenty of air pockets and space for air to flow through so adding twigs, woodchips, straw, and cardboard helps. And always remember: try for a good mix of greens and browns – these are the essential ingredients.

#### Suitable materials

Soft landscape materials to start with, e.g. grass cuttings, weeds, leaves, old plants, flowers, etc. Vegetative food scraps can be buried into the composting materials once the compost heap is well established.



# HOUSEHOLD COMPOSTING

## for Urban and Home Gardening

### Main Advantages:

- Simple, low maintenance system. Better if turned regularly – it will decompose faster.
- Ideal for homes with small gardens and for people who do not want to spend a lot of time working on their compost.
- Can also be used to compost turf/sod or leaves on their own.
- Relatively cheap

### Disadvantages:

- In the plastic bins it can be difficult to turn compost material with a garden fork. Aerator tools which have long handles to reach the bottom of the bin can help to eliminate this problem.
- Removing compost from the bottom can sometimes be awkward. Often its best to remove the top layers, harvest the compost at the bottom and restart with the un-composted materials. For plastic bins, the entire bin can be removed to access the compost.
- As it has an open bottom in contact with the ground it can attract rodents. Adding wire mesh to the bottom of the bin can prevent this problem.

Source: ATI-CAR Module on Composting in the Household by Vicky May Guinayen

# FREE RANGE CHICKEN PRODUCTION

## for Urban and Home Gardening

Free range chicken is a new and promising venture for both backyard and commercial farms. Its care is simple and requires a relatively lower production cost. Women and children can do the feeding and other maintenance activities. Free range chicken production can provide meat, eggs, and additional income to the family.



### Characteristics of Free-Range Chicken

- Body is similar to broilers
- Meat taste is similar to that of native chickens
- Can lay up to 250 eggs in a year
- Flightless because of its heavier weight
- Does not need to be caged all the time
- Does not brood its eggs
- Requires ranging area

### Requirements in Free Range Chicken Production

- Proper housing with waterer, feeder
- Brooding for two weeks to one month
- Free range management
- Proper feeding
- Regular provision of water
- Record keeping
- Laying nest, hen house, or chicken coop

### Care and Management

#### A. Brooding Period- provision of additional heat to the chicks

- Housing should be cleaned before use.
- Start heating the chick house even before putting in the chicks.
- Cover the chick house with sack or any similar material available.
- Cover the floor with newspaper or rice hull at two inches thick.
- Brood the chicks up to 14 days or until the primary feathers have grown. (1 watt per bird) Charcoal can also be used. It is recommended that the charcoal be placed in a can covered by wires.
- Give the chicks a mixture of water and brown sugar during their first day.
- Red feeding plate is recommended but bamboo cut in half can be use
- Mix 1 cup newly chopped young bamboo leaves with 1 cup brown rice given to day old chicks
- Chicks should be fed chick boosters up to 14 days.
- Give the NCD B1B1 vaccine on the ninth day, one drop on the eye per chick.
- Secure the chicks from rats and snakes.

# FREE RANGE CHICKEN

## for Urban and Home Gardening

### B. Growing period

- Feed the chicks with starter feeds from 15 to 45 days.
- One-month old chicks can be allowed to roam freely from 9:00AM to 4:00 PM
- Chicks at this stage can also be fed with fruit and vegetable trimmings, leaves, and grasses.

### C. How to Make Home-Made Grower FRC Feeds

Mix the following ingredients:

- 1 can yellow corn or binlid (rice particles) or boiled sweet potato, gabi
- 1.5 can rice bran or azolla
- 1 can ground golden apple snails
- 1.5 can copra meal
- ½ can mongo or soy bean
- ½ can dried ipil-ipil leaves
- 1 spoonful salt
- 1 handful lime



### D. Recommended Formula for Home-Made and Affordable Layer Feeds

- 25% rice bran
- 25% corn grits
- 25% copra meal
- 25% laying mash

### E. Recommended Feeding Rate

- Double the recommended feed amount for home-made grower feeds when given wet
- Add calcium supplement to enhance egg shell hardening.

Feeds	Age of chicken (weeks)	weight of chicken (g)	Amount of feeds (g) per chicken per feeding
Chick Booster	1	80	15
	2	110	20
	3	130	25
Chick Starter	4	190	30
	5	225	35
	6	280	40
Chick Grower	7	350	45
	8	440	50
	9	525	55
	10	600	60
	11	670	65
	12	750	70
	13	810	75
	14	870	80
	15	920	85
	16	970	88
	17	1,100	90



# FREE RANGE CHICKEN

## for Urban and Home Gardening

### F. Laying Stage (5 months to 2 years)

1. Breeding - choose the biggest and healthiest rooster with no body deformities
2. Hatching  
Natural brooding- presence of broody hen to sit the eggs for hatching  
Artificial brooding - use of incubator.
  - Collect the eggs daily at 2x a day: 10am and 3pm. Do not leave eggs on the nest as this will encourage brooding.
  - Arrange the eggs in a tray such that the egg is in an upright position with the blunt-end part up.
  - You can store the eggs up to seven days. After that the eggs need to be brood either naturally or artificially
  - Seven to ten eggs are recommended for hatching using a native chicken while 12-15 eggs using a duck.
  - Select clean and medium size egg for incubation
  - The incubation period takes 18 days after which hatching may occur within any of the three succeeding days at 37.0 to 37.5 °C and at 60% humidity.

### G. Health Programs

The following vaccines should be administered as follows:

Age of Birds	Vaccine/ Health Management	Route
7 days	NCD B1B1	Eye Drop
14 days	IBD Intermediate Vaccine	Drinking Water
28 days	NCD La Sota	Drinking Water
60 days	Pox Vaccine	Wing Web
120 days	NCD La Sota	Drinking Water
	Pox Vaccine	Wing Web
	Deworming	Drinking Water
1 year	NCD La Sota	IM

Separate sick or weak chickens and immediately bury dead ones.

Source: ATI-CAR Module on Free Range Chicken Production by Maribeth M. Ladu-an

# UPLAND KANGKONG PRODUCTION

## for Urban and Home Gardening

**K**angkong is one of the most popular leafy vegetables in South and Southeast Asia. It is known by many names including swamp cabbage, water convolvulus, and water spinach.

Young leaves, petioles and stems are used as vegetable, cooked alone or with meat or fish. The leaves are a good source of protein, vitamin A, iron, and calcium.



### Climatic and Soil Requirements

- Upland kangkong can be grown from low to mid elevations throughout the year. Production is best in sandy to clay loam soil with high levels of organic matter and a pH of 5.5 to 6.5.
- Optimum yield is achieved in lowland humid tropics under stable high temperatures and short daylengths. Temperatures averaging between 25-30°C are ideal. Plants are damaged at temperatures of 10°C or less.

### Choosing a variety

- There are two common types. Upland kangkong (*Ipomoea reptans*) has narrow leaves. It is adapted to moist soils and is harvested once. Lowland or aquatic kangkong (*Ipomoea aquatica*) has broader, arrow-shaped leaves. It is adapted to flooded conditions and is harvested several times. Regardless of type, the choice of variety can be influenced by local growing conditions, seasons, and consumer preferences.

### Land Preparation

- Prepare land by plowing and harrowing twice. Kangkong requires a well-prepared seed bed for good seedling growth. Prepare raised beds 1 m wide. Spread well-decomposed animal manure at the rate of 1–2 kg/m<sup>2</sup> between beds. Make shallow lines 10 cm apart across the beds before sowing.
- 
- For small areas, pots and containers can be used, mix well a part of garden soil with one part of compost and one part of rice hull if available.

### Seedling Preparation and Planting

- Kangkong can be grown in garden plots and containers. It can either be planted by direct seeding, transplanting, or using stem cuttings. The choice of planting method depends on the availability of seed and labor, growing season, and type of kangkong.

# UPLAND KANGKONG PRODUCTION

## for Urban and Home Gardening

### Direct seeding

- Direct seeding is done either by line-sowing or broadcasting. When line-sown, seeds are sown in rows on well-prepared seedbed. Make furrows 1 to 1.5 cm deep and space them 15 to 20 cm apart. Sow seeds 5 cm apart in rows.
- For pots and containers, broadcast the seeds evenly then cover seeds with a layer of compost. After developing two to three true leaves, thin seedlings to stand 10–15 cm apart.

### Transplanting

- Seedlings can be grown in containers, pots, trays or in seedbeds. Use plastic seedling trays for growing containerized transplants. Fill the seedling tray with a potting mix from soil, compost or rice hulls, and/or sand. Sow two or three seeds per cell then thin to one seedling after they develop two to three leaves.
- If seedlings are raised seedbed, sow seeds by broadcasting evenly, cover with soil then water thoroughly every morning or as needed (moist, but not wet). Seedlings are ready for transplanting about three weeks after sowing or when transplants have five to six leaves.

### Using stem cuttings

- Stem cuttings from an existing kangkong crop can also be used for planting when seeds are not available or insufficient. This method is commonly used when planting the broadleaf, lowland type of kangkong. Cut stems 15 to 25 cm in length with three to four internodes during the first harvest then soak in water overnight before transplanting.
- In some cases, cuttings are soaked in water for 1–3 days to develop roots before transplanting in the field. Dig holes 5–10 cm deep and plant two to three stem cuttings per hole. Spacing between rows is 20–30 cm and plants within rows are spaced 15–20 cm apart. Irrigate immediately after planting.

### Fertilization

- Kangkong can thrive under conditions of moderate soil fertility, yet is quite responsive to nitrogen fertilizer and organic manure. A combination of inorganic and organic fertilizers improves yield and maintains soil fertility. The amount of fertilizer to apply depends on soil fertility, soil type, fertilizer recovery rate, and soil organic matter.
- Apply 1-2 kg/m<sup>2</sup> animal manure before sowing. Ten to fifteen days later, top dress with urea (46-0-0) or ammonium sulfate (21-0-0).

# UPLAND KANGKONG PRODUCTION

## for Urban and Home Gardening

### Irrigation

- Kangkong requires plenty of water because of its high succulence. Water should be applied especially just after sowing or transplanting to ensure a good stand. Water the plants every day or as needed.

### Pest and Disease Management

- Diseases and insect pests must be controlled to ensure good yield and marketable quality. Caterpillars, whiteflies and aphids cause serious damage. Control by regular pruning of stems. Regular pruning at three weeks interval can minimize white rust. Spray the plants with hot pepper extract or insecticidal soap to get rid of aphids.
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- Numerous cultural practices can reduce the incidence of disease, including crop rotation, field sanitation, adequate plant spacing, and using furrow rather than overhead irrigation.

### Harvesting

- Kangkong is ready for harvest by cutting young shoots 20 to 50 days after sowing depending on variety and plant type. Plants may be harvested once or several times. For once-over harvesting, plants are uprooted 20 to 30 days after sowing. For multiple harvesting, stems or shoots 15–25 cm in length are cut close to the ground, generally on a weekly basis.
- Harvest during the cooler time of day, such as early morning or late afternoon. Keep the harvested produce in a cool shaded place.



Source: Palada, M.C and Chang, L.C. 2003. Suggested Cultural Practices for Kangkong. AVRDC.

# ZUCCHINI PRODUCTION

## for Urban and Home Gardening

**Z**ucchini is categorized as a summer squash and a member of the gourd family. It is actually a young fruit that belongs to the Cucurbitaceae plant family, alongside other favorites like cucumbers and gourds. It provides micronutrients, such as vitamins C and B6, riboflavin and manganese. It is a cholesterol-free, low-sodium, gluten-free, fat free and low-calorie.



### Soil Requirement

- Zucchini plants are so prolific and easy to grow in both sandy and dense clay-like soil, and everything in between. They can be grown in both container and traditional vegetable gardens. Zucchini plants require at least 6-8 hours of daily direct sunlight.

### Soil Preparation and Planting

- For home garden, make sure the soil is well tilled down to a depth of 8 inches. Create small hills or mounds a foot across approximately 4 inches high. Space the mounds 24 inches apart for bush varieties. Remember to choose a sunny location as zucchini plants need 6-8 hours of daily direct sunlight for maximum production. Using your finger or the handle end of a hoe or trowel, create two holes approximately 1 inch deep near the center of each mound. Place a seed in each hole, cover with an inch of soil and water thoroughly. When the seedlings begin to sprout, thin to one seedling in each mound.
- For container garden, no need to create the mounds. Choose bush variety and select container of at least 18 inches across and 12 inches deep. The container should have holes in the bottom for adequate drainage. Place the containers in a location where they will receive adequate direct sunlight. Plant 2-3 seeds per container and thin 1-2 plants when the seedlings emerge.

### Water Management

- Zucchini squash have a fairly high water content and the plants will benefit greatly from consistent watering. When watering zucchini plants, focus a slow stream of water at the base of the plants. Avoid watering the tops of the plants as this may encourage diseases to develop.
- Make sure that the water does not erode any of the soil away from the base of the plants. Exposed roots will lead to insect problems and under-performing plants.

# ZUCCHINI PRODUCTION

## for Urban and Home Gardening

### Fertilizer Management

- It is best to fertilize when the seedlings emerge and then again when the blossoms appear and the plants begin to set fruit. It is best to use a balanced, water soluble fertilizer and apply according to the manufacturer's direction.
- For organic production, mix compost or animal manure into the soil just before planting. After the blossoms appear, you can also apply an organic fertilizer.

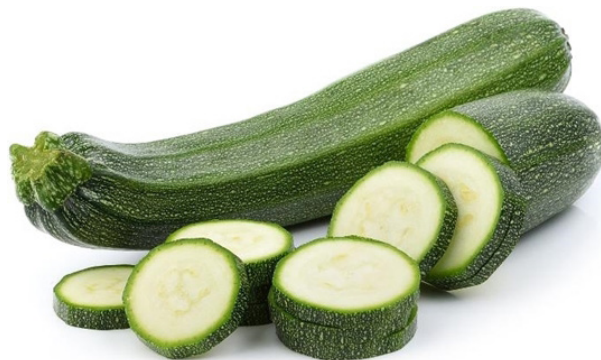
### Pest and Diseases Management

- Choose pest resistant zucchini varieties and keep your home garden free of weeds and other plant debris. You can also cover the stems of the plants with cardboard tubes to discourage pests.
- Homemade soap spray can be used for pest and diseases. Mix together 2 gallons water, 4 tablespoons hot sauce and 4 tablespoon liquid dish soap. Mix it well and spray all over the plants every 10 days.

### Harvesting

- Zucchini is best harvested when the fruit is about 6 inches long. At this stage, the skin is still very tender and the seeds are quite small.
- If you intend to make stuffed zucchini or zucchini bread, you can let the squash grow a bit larger.
- Use a knife or shears and cut the stem 1 inch above the squash.
- Do not try to pull or twist the squash off the vine as it will damage the plant and root system.

Source: <https://www.backyard-vegetable-gardening.com/growing-zucchini.html>



# LETTUCE PRODUCTION

## for Urban and Home Gardening

Lettuce can be easily grown both in backyard gardens and in small and large-scale farms. It grows best on regularly watered loamy soil with high organic matter content and in an environment with a temperature ranging from 18°C to 22 °C.

### Varieties

- There are a lot of lettuce varieties. The most common are Loose Leaf, Romaine, and Crisp Head.

### Sowing

- Lettuce grow better if these are sown first using seedling trays. You may also improvise seedling trays for your home garden. Pulverize soil before filling your containers.
- For home gardens with wider areas you can mix one (1) kg of compost for every square meter of soil. Seeds should be sown  $\frac{1}{4}$  inch deep and thinned when plants have 3 to 4 true leaves. Soaking the seeds in water for four (4) hours before sowing enhances germination.

### Water and Nutrient Management

- Water at least once a day. It is best to water the plants in the morning.
- Apply nitrogenous fertilizers such as fermented plant juice once a week. Compost may also be applied before planting and three weeks after transplanting.

### Transplanting

- Lettuce seedlings can be transplanted after 10 to 14 days. Water the seedlings before removing these from the seedling tray to lessen root damage and transplanting shock.
- You can transplant lettuce directly in plots, or in pots. You may also use recycled materials such as pails, basins, etc.



# LETTUCE PRODUCTION

## for Urban and Home Gardening

### Common Pests and Diseases

The most common insect pests of lettuce are aphids and semiloopers.

- Aside from frequent handpicking in the case of semi-loopers, and immediate removal of infested plant part for aphids, hot pepper is also a readily available home remedy in case of severe infestation.
- Mix 50 grams of crushed hot pepper and one-half (½) tablespoon powdered detergent soap in eight (8) liters of water. Spray the solution on the lettuce including the undersides of the leaves.
- Lettuce is also susceptible to rotting caused by fungus. This can be mitigated through proper plant distancing, sufficient sunlight exposure, and proper soil mixture to achieve optimum soil aeration, eliminate excess moisture, and avoid water logging.

### Harvesting

- Harvesting can be done after 45 to 60 days depending on the variety. Crispheads can be harvested once the heads are firm while loose-leaf varieties should be harvested before flowering. Harvest is best done in the morning.

### Nutritional Value

- Lettuce is an excellent source of vitamin A (in the form of carotenoids), vitamin K, folate, molybdenum, dietary fiber, manganese, potassium, biotin, vitamin B1, copper, iron and vitamin C. It is also a good source of vitamin B2, omega-3 fatty acids, vitamin B6, phosphorus, chromium, magnesium, calcium and pantothenic acid.





# PECHAY PRODUCTION

## for Urban and Home Gardening

**P**echay is a vegetable commonly planted in backyard gardens. It grows best on regularly watered loamy soil with high organic matter content and in an environment with a temperature ranging from 18 to 22°C. It is high in folic acid, rich in vitamin K, a good source of calcium and contains fiber.



### Soil Preparation

- Mix part of well-pulverized soil with 1 part compost and one part rice hull. For home gardens with wide areas, mix 1 kg compost and 300 grams rice hull for every 1 square meter of soil.

### Planting and Nutrient Management

- Pechay can either be sown directly in soil or transplanted. Direct seeding is done by broadcasting or by sowing in rows. Cover the seeds by spreading additional topsoil. Water immediately after sowing.
- Sow seeds in seedbeds or seedling trays. Transplant seedlings 10 days after sowing. Transplant preferably in the afternoon and water immediately. You can use 1.5L plastic bottles as growing pot. Each plastic bottle can accommodate two seedlings. The bigger the container the better.
- If seedlings are transplanted in plots, transplant 10 days after sowing at a distance of 10 cm between plants and 20 cm between rows. Water regularly and apply organic probiotics like vermin-tea or Fermented Plant Juice (FPJ) if available to promote better growth.

### Watering

- Water the plants 2 to 3 times a week or as needed. Remove weeds regularly.

### Pests

- Common insect pests of pechay include diamond back moth, cutworm, and aphids. Hand picking of insect pests is recommended.

### Harvesting

- Harvest as early as three weeks after planting or between 30-40 days after sowing. Harvest preferably in the afternoon to minimize postharvest losses.

# BEAN PRODUCTION

## for Urban and Home Gardening

**B**ean (*Phaseolus vulgaris* L.), is the general term for “Baguio bean,” “habichuelas” and “French beans.” It is one of the most widely cultivated vegetable legumes in the Philippines. Beans are rich in vitamins A, C, and K, folic acid and fiber.



### Soil and Climate Requirements

- Snap bean grows best in well-drained, clay loam soil, rich in organic matter with pH ranging from 5.5. to 7.5.

### Soil Preparation and Planting

- Prepare a potting medium by mixing garden soil, rice hull and compost at 1:1:1 ratio. Fill pots with mixed media, directly sow 2-3 seeds per pot then cover lightly with soil. Use 1.5L softdrink plastic bottle, but the bigger the container the better.

### Fertilization

- As the plant grows, apply well-decomposed chicken manure or compost. Tea manure and fermented plant juice (FPJ) diluted with water and drenched to improve soil fertility.

### Irrigation

- Snap bean requires constant supply of moisture throughout the growing period. Water the plants regularly to enhance flowering and pod setting. Avoid too much water, this can cause root rot. On the other hand, too little water can result to flower and pod drop.

### Harvesting

- Pole snap bean is harvested 60-70 days after planting (DAP), depending on the pod diameter and toughness. Pole snap bean is handpicked every 3-5 days.
- Bush snap bean can be harvested as early as 55-60 DAP or at 2 weeks after flower opening.
- Harvest pods that are well formed, straight, bright in color, fresh in appearance, tender but firm, and crisp.



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