



Republic of the Philippines
Department of Agriculture
AGRICULTURAL TRAINING INSTITUTE
Cordillera Administrative Region
BSU Compd., La Trinidad, Benguet

A GUIDE TO URBAN / HOME GARDENING



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URBAN AGRICULTURE

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

Edible 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

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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

Container 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.

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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 encourages 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 form 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.

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5. 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.
6. 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.

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- 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.

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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.

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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

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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 mungo 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

AMPALAYA PRODUCTION

for Urban and Home Gardening

Bitter Gourd is known in the Philippines as “ampalaya.” It is widely grown for its nutrients and medicinal properties. The crop has been a folkloric cure for generations but has now been proven to be an effective herbal medicine for many ailments. Ampalaya contains a mixture of flavonoids and alkaloids which makes the pancreas produce more insulin that regulates the blood sugar in diabetics. It has many other herbal benefits such as antioxidant, paraciticide, antibacterial and antipyretic. It is also a good source of vitamins A, B, and C, iron, folic acid, phosphorus and calcium.



Ampalaya is prepared in various dishes such as stir-fried with ground beef and oyster sauce or with eggs, with diced tomato and pinakbet, a very popular dish of the Ilocanos. The young shoots and leaves are eaten as greens/salad.

Soil and Climatic Requirements

- Ampalaya can be grown in any type of soil. However, the best type and texture of soil for this crop is sandy loam or clay loam with good drainage, high organic matter and with pH ranging from 6 to 6.7. October-February is the ideal planting season because cool months favor more fertilized flowers thus better production.

Preparation of Potting Medium

- Mix 1 part garden soil, 1 part compost/vermicast and 1 part CRH/coir dust/rice hull and put them in pots measuring 12 inches in diameter and 14 inches in height. The bigger the pot, the better. Compact the soil lightly to eliminate air pockets. Leave at least a quarter of an inch of empty space to accommodate water during watering.

Seed Preparation

- Break the seed coat by cutting the pointed tip of the seed with a nail-cutter. Soak the seeds in clean water for 24 hours. Pre-germinate seeds by wrapping it with moist cloth and incubate in a dark place for 24-48 hours or until seed coat breaks.

Planting

- For direct seeding, sow 1-3 pre-germinated seeds directly in the prepared pots then cover with soil as thick as its diameter. For transplanted, sow pre-germinated seed or in a seedling tray/box then transplant in the pot two weeks after germination. Water the soil to ensure good contact with the seed. It takes 5-10 days before Ampalaya germinates.

AMPALAYA PRODUCTION

for Urban and Home Gardening

Water and Nutrient Management

- Like Upo, Ampalaya is sensitive to water logging or excessive moisture. It favors disease development. Make sure the pot should have enough holes for good drainage. Water the plants every other 1-2 days and every time you apply fertilizer.
- Before transplanting, add a handful of compost/vermicast/manure to the hole as basal fertilizer. To boost plant vigor, apply weekly (spray or drench) organic probiotics preparations like IMO, Vermitea, FAA, OHN and FPJ during vegetative stage. During reproductive stage, apply FFJ, CalPhos or OHN to support flower & fruit development.
- For non-organic production, add 2 tbsp. of complete fertilizer (14-14-14) in the hole then cover it with a handful compost prior to planting. Three to four (3-4) weeks after planting, apply 1 tbsp. of urea by burying it in a 1-inch deep hole 3-4 inches away from the stem. Repeat application of urea (46-0-0) every two for 2-3 times more depending on the crop stand.



Trellising and Pruning

- Ampalaya requires trellis for better fruit development, unless it is intended for vine production only. Improvise vertical and overhead trellis using available materials like sticks/bamboo, galvanized wires, old nets or plastic twines or let it creep along fences. All leaves and lateral vines within 1 meter from the ground should be removed. Maintain at least 2 main fruiting vine. Prune unproductive lateral vines and sell it in the market or use it for family consumption. Remove damaged and deformed fruits while still young to prevent nutrient competition.

Pest Management

- Fruitfly is the most destructive insect pest of Ampalaya and bacterial wilt is its most destructive disease. For fruitfly, you can use attractants or immediately wrap the developing fruit to protect it from the insect. For bacterial wilt, you can use OHN and IMO as soil drench to build up good microorganisms in the soil and prevent growth of harmful organisms. Sanitation or removing diseased or damaged plant or its parts and burying them also helps.
- For non-organic production, you can use appropriate chemical pesticides available in the market

Harvesting

- Harvest fruits 18-20 days after blooming or when the fruits attain full size, with seeds still immature. This occurs three (3) weeks after petals fall. To harvest, hold the fruits with one hand then cut from its peduncle using a sharp knife.

Reference:

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- <https://www.pinoybisnes.com/agri-business/ampalaya-production-guide/>
- <https://www.mnlgrowkits.com/blogs/tips/how-to-grow-ampalaya>

BOTTLE GOURD PRODUCTION

for Urban and Home Gardening

Bottle Gourd is commonly called Upo among the Tagalogs. Other local names are Tabungaw (Ilokano) and Kandol (Ibanag). Young fruits are usually cooked as vegetable dish, the young shoots are consumed as green vegetables, while seeds are popular snack food. It contains carbohydrates, minerals and vitamins.

Juices from the green fruit is good for the treatment of chest pains, insanity, epilepsy and other nervous diseases. It is also used in the treatment of stomach acidity, indigestion and ulcer. The leaves were used to treat skin diseases, Boiled seeds is also good for the treatment of boils.



Preparation of Potting Medium

- Mix 1 part garden soil, 1 part compost/vermicast and 1 part CRH/coir dust/rice hull and put them in pots measuring 12 inches in diameter and 14 inches in height. The bigger the pot, the better. Compact the soil lightly to eliminate air pockets. Leave at least a quarter of an inch of empty space to accommodate water during watering.

Seed Preparation.

- Soak the seeds in clean water for 24 hours. Pre-germinate seeds by wrapping it with moist cloth and incubate in a dark place until seed coat breaks.

Planting

- Sow pre-germinated seeds directly in the prepared pots or in a seedling tray/box (if to be transplanted two weeks after germination).

Water and Nutrient Management

- Upo is sensitive to water logging or excessive moisture. It favors disease development. Make sure the pot should have enough holes for good drainage. Water the plants every other 2 days and every time you apply fertilizer.
- Before transplanting, add a handful of compost/vermicast/manure to the hole as basal fertilizer. To boost plant vigor, apply weekly (spray or drench) organic probiotics preparations like IMO, Vermitea, FAA, OHN and FPJ during vegetative stage. During reproductive stage, apply FFJ, CalPhos or OHN to support flower & fruit development.
- For non-organic production, add 1 tbsp. of complete fertilizer (14-14-14) in the hole then cover it with a handful compost and prior to planting. One month after planting or when vines are 1 meter long already, apply 1 tbsp. of urea by burying it in a 1-inch deep hole 3-4 inches away from the stem. Two weeks after, apply 2 tbsp of urea(46-0-0) and 1 tbsp. of potash (0-0-60). Depending on the crop stand, repeat application of urea and potash after 15 days.

BOTTLE GOURD PRODUCTION

for Urban and Home Gardening

Trellising and Pruning

- Upo requires trellis for better fruit development and avoid deformed or rotted fruits. Improvise vertical and overhead trellis using available materials like sticks/bamboo, galvanized wires or plastic twines or let it creep along fences. Once the vine reaches the top of the trellis, cut the tip to promote branching. All lateral vines below the cut tip should be removed.

Pest Management

- Squash beetle is the common insect pest and fruit rot is the common disease of upo. For insects, you can use OHN and other botanical pesticide preparations such as hot pepper and lemon grass extracts, ginger extract, tomato extract and others. For fruit rot, you can use OHN and other botanical fungicides such as extracts of onion , ipil-ipil, kamantigi and takip kuhol.
- For non-organic production, you can use appropriate chemical pesticides available in the market.

Harvesting

- It usually takes 15 days from the day of fruit set to reach marketable size. Using a sharp knife, harvest the fruit by cutting its peduncle 5cm above the fruit base. If it is for marketing, avoid skin bruises and pack in plastic bags.

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EGGPLANT PRODUCTION

for Urban and Home Gardening

Eggplant is extensively grown in the Philippines and is one of the most important vegetables. Its young fruits may be roasted, fried stuffed, cooked as curry, pickled or prepared with other vegetables as the popular Ilocano dishes, pinakbet and dinengdeng. Eggplant is a good source of potassium, iron, protein and Vitamins A and B.



Eggplant is naturally low in calories and no fat. Eggplant skin is called "nasunin." Nasunin is a potent antioxidant and free radical scavenger that has been shown to protect all membranes from damage.

Preparation of Potting Medium

- Mix 1 part garden soil, 1 part compost/vermicast and 1 part CRH/coir dust/rice hull and put them in pots measuring 12 inches in diameter and 14 inches in height. The bigger the pot, the better. Compact the soil lightly to eliminate air pockets. Leave at least a quarter of an inch of empty space to accommodate water during watering.

Seed Preparation

- Soak seeds in clean water for 24 hour then air dry to avoid seeds sticking together during sowing. It takes 7-10 days before eggplant germinate.

Planting

- As a practice, small seeds like eggplant are germinated first in seedbeds or seedling tray/box. Two to four (2-4) weeks after germination, they are ready to be transplanted. Before transplanting, add a handful of compost/vermicast in the hole. Transplant 1 seedling per pot. Water to ensure good contact between the root and soil.

Water and Nutrient Management

- Like Upo and Ampalaya, Eggplant is sensitive to water logging or excessive moisture. It favors disease development. Make sure the pot should have enough holes for good drainage. Water the plants regularly every other 1-2 days and every time you apply fertilizer.
- Before transplanting, add a handful of compost/vermicast/manure to the hole as basal fertilizer. To boost plant vigor, apply weekly (spray or drench) organic probiotics preparations like IMO, Vermitea, FAA, OHN and FPJ during vegetative stage. During reproductive stage, apply FFJ, CalPhos or OHN to support flower & fruit development.

EGGPLANT PRODUCTION

for Urban and Home Gardening

- For non-organic production, add 1 tbsp. of complete fertilizer (14-14-14) in the hole then cover it with a handful compost prior to transplanting. Follow the recommended fertilization schedule below:

Time of Application (Weeks After Transplanting (WAT))	Drenching Solution (1 small sardine can/plant)
3, 5, 9, 13 and 17 WAT	Dissolve 3 tbsp urea (46-0-0) + 15 L water
7, 11, 15 and 19 WAT	Dissolve 3 tbsp muriate of potash (0-0-60) + 15 L water.

Staking and Pruning

- For better plant growth and fruit development, prune excess/damaged/diseased leaves, branches and fruits to avoid nutrient competition and promote better air circulation. Good air circulation prevents diseases from developing. Maintain 2-4 main fruiting branches for better fruit quality. Likewise, prune all lateral shoots that sprout below the fork branch (Y). Installing a bamboo stake is sometimes necessary to support the weight of the eggplant.

Pest Management

- Shoot tip and fruit borer are the major insect pests of eggplant which are very hard to control. Likewise, aphids, thrips and green leaf hoppers also cause damages. Phomopsis rot is considered the major disease.
- Aside from spraying botanical pesticides, growing aromatic crops like basil, allium, ginger, lemon grass and marigold can help repel insects. Likewise, growing cosmos, sunflower and zinnia attracts beneficial insects. Sanitation or removing diseased or damaged plant or its parts and burying them also helps.
- For non-organic production, you can use appropriate chemical pesticides available in the market.

Harvesting

- Harvest mature fruits which are shiny and still soft. More frequency harvesting can reduce damage from fruit borers. Harvest all fruits including deformed and damaged ones to prevent spread of pests and diseases. Harvesting can last for 3-6 months.



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Reference:

- Eggplant Production Guide. PCARRD
- <https://www.gardeningknowhow.com/edible/vegetables/eggplant/container-eggplant-plants.htm>

MUSTARD PRODUCTION

for Urban and Home Gardening

Mustard is a fast growing green leafy vegetable packed with a lot of nutrients such as vitamins C, A, and K, and minerals calcium and copper. Its seeds are rich in fiber, selenium, magnesium, and manganese.

Several researches claim that mustard is rich in glucosinolates and powerful antioxidants, both of which promote health and may protect against various diseases such as contact dermatitis, cancer, diabetes and high blood pressure.

It is usually eaten as salad (raw green), pickled or processed as a spice. Though it is generally healthy, eating too much raw mustard leaves can cause upset stomach, especially those with abnormal thyroid function.



Soil and Climatic requirement

- Mustard grow well in areas with full sunlight (although it tolerates partial shade) and a temperature of 15-25 °C. It favors soils rich in organic matter and with good draining properties. It does not tolerate flooding or waterlogged condition. Ideally, mustard is planted in October-December. However, off-season production can start in April.

Sowing and seedling management

- Thinly sow mustard seeds in a soil medium of 2 parts garden soil and 1 part organic matter (compost/vermicast) and 1 part CRH/Rice hull. However, you can use any soil medium that is available to you. Sow only what your planting plots area can accommodate or based on available pots you can plant on to avoid wastage. Cover the seeds with thin soil then water. It is better if you can patiently sow the seeds one by one in a seedling tray. This will allow better root germination and avoid damaged and tangled roots during transplanting.
- In 3-5 days, expect the seeds to germinate. Continue watering the seedling with the use of a hand spray (do not use a dipper to avoid damaging the delicate seedlings). Continue caring for the seedlings until they are ready to transplant.

Transplanting and plant care

- Two weeks after germination, transplant the seedlings in individual pots. At this stage, the seedling has developed true leaves and is capable to make its own food through photosynthesis.

MUSTARD PRODUCTION

for Urban and Home Gardening

- You can use 1.5 L softdrink plastic bottle, but the bigger the container the better. If you have plant beds or soil plots, transplant at a distance of 15x15 cm. Water regularly and apply organic probiotics like vermin-tea or Fermented Plant Juice (FPJ) if available to promote better growth.

Pest and Disease Management

- Mustard is susceptible to leaf spots, downy mildew, white rust, Sclerotinia stalk rot (white mold) and mosaic virus.
- On the other hand, the most serious insect pests are the caterpillars (of diamond-back moth) and the flea beetles. Hot, sunny weather encourages feeding while cool, damp conditions slows insect feeding and promotes crop growth. Severe infestation may result in reduction of plant vigor or even death.
- In potted condition (limited number of plants), the best way to manage these is through prevention. Regular monitoring and the use of organic probiotic preparations to boost the health of the plants help. In case of occurrence, apply botanical pesticides or manually handpick and crush caterpillars or manually remove infected parts.

Harvesting and Post-harvest

- You can start harvesting as early as 35-40 days after germination, depending on the vigor of the plant. There are two ways in harvesting. One is by cutting only large-sized leaf and two, uprooting the whole plant. Leaf cutting is usually done for home consumption. This allows you to harvest over and over again on the same plant. The second one is usually done if you are going to sell your harvest to the market.
- Mustard can be preserved into pickles. In some countries, they are drying it like mushroom.



References:

- "Is Mustard Good For You?" lifted from <https://www.healthline.com/nutrition/is-mustard-good-for-you> on June 3, 2020.
- Mustard. Lifted from <https://www.hort.purdue.edu/newcrop/afcm/mustard.html> on June 3, 2020.
- Mustard . Lifted from <http://ikisan.com/up-mustard-Soils-Climate.html> on June 3, 2020.
- Introduce leafy mustard (Gai Choy) and how to grow. Lifted from <https://www.youtube.com/watch?v=VQBZiWHjy4A>

OKRA PRODUCTION

for Urban and Home Gardening

Ookra (*Hibiscus esculentus* L.) is a tall growing, warm season and annual vegetable crop. The young and tender fruits can be prepared as salad, boiled, broiled or fried and can be mixed in any meat and fish dishes. Okra is rich in Vitamin A, protein, calcium, fats, potassium, phosphorus, iron and carbohydrates.



Aside from its nutritional value, okra is used in traditional medicine for the treatment of stomach ulcer, inflammation of the lungs, colitis and sore throat.

Soil and Climatic Requirements

Okra can tolerate a wide range of soil types but for better yield, plant in silty to sandy loam soils that are well-drained and with adequate organic matter. It grows well in long warm days (summer).

Seed Preparation and Planting

- Prepare a potting medium by mixing 1 part of garden soil, 1 part rice hull, and 1 part compost then fill pots with mixed media. Use pots measuring 9 inches in diameter with a height of 12 inches but the bigger the container the better. To attain uniform germination and good crop stand, soak the seeds overnight before planting. Plant okra seeds in slightly moist soil at a rate of 2 to 3 seeds per pot at 2 to 5 cm deep.

Water and Nutrient Management

- Water the plants every other day and every time you apply fertilizer.
- To boost plant vigor, apply weekly (spray or drench) organic probiotics preparations like IMO, Vermitea, FAA, OHN and FPJ during vegetative stage. During reproductive stage, apply FFJ, CalPhos or OHN to support flower and fruit development.
- For non-organic production, add 1 tbsp. of complete fertilizer (14-14-14) in the hole then cover it with a handful compost or soil prior to sowing. One month after sowing, apply 1 tbsp. of urea (46-0-0) per plant by burying it in a 1 inch deep hole 3-4 inches away from the stem.

OKRA PRODUCTION

for Urban and Home Gardening

Pest Management

- Cotton stainer and stink bug are the common insect pests of Okra, while Cescospora blight, powdery mildew, and fruit rot are the common diseases caused by fungi. For insects, you can use OHN and other botanical pesticide preparations such as hot pepper and lemon grass extracts, ginger extract, tomato extract and others. For diseases, you can use OHN and other botanical fungicides such as extracts of onion, ipil-ipil, kamantigi and takip kuhol.
- Aside from spraying botanical pesticides, growing aromatic crops like basil, allium, ginger, lemon grass and marigold can help repel insects. Likewise, growing cosmos, sunflower and zinnia attracts beneficial insects. Sanitation or removing diseased or damaged plant or its parts and burying them also helps.
- For non-organic production, you can use appropriate chemical pesticides available in the market.

Ratooning (optional)

- Ratooning is cutting of stem of old plants to induce branching and emergence of new shoots.
- After harvesting, cut the stems leaving about one foot from the ground. Shallow cultivate and apply fertilizer to induce shoot emergence.

Harvesting and Postharvest Activity

- Okra starts to flower 40 to 75 days after planting. Young and tender fruits can be harvested 4 to 6 days from flowering. Harvest only the fruits that measures 3 to 4 inches at 2 to 3 days interval.
- Harvest in the morning or late in the afternoon to maintain the freshness of the fruits.



Trivia:

Did you know that Okra can be eaten raw/fresh?



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