

Giandam sa

Regional Agriculture and Fisheries Information Section (RAFIS)

sa pakigtambayayong sa

High Value Crops Development Program

ug gipunduhan sa

Special Area for Agricultural Development (SAAD) PROGRAM

DEPARTMENT OF AGRICULTURE

Central Visayas

Maguikay, Mandaue City, Cebu

Tel. Nos. (032) 888-8022, 268-5187

kaya ko to!

kung kaya nimo, kaya sad nako

Gender equality

Vegetable Production

with Magna Carta of Women (RA 9710)



What is Vegetables?

Vegetables is an edible plant whose fruit, seeds, roots, tubers, bulbs, stems, leaves, or flower parts are used as foods (eaten in cooked or raw) to give nutrients/nourishment to the body.

Importance of Vegetables

1. Nutrition: It nourishes the body with nutrients essential for good health and well functioning of the body.
2. Economic: it generates employment and serves as source of income.
3. Industrial uses: serves as component in some industrial products

Types of Vegetables

A. According to plant parts

a.1. Leafy vegetables

Example:	Pechay	lettuce	cabbage
	Mustard	Kangkong	Alugbati
	Sweet Potato		

a.2. Root or bulb crops

Example:	Onion	Radish	Garlic
	Carrots	Sweet Potato	

a.3. Beans

Example:	Munggo	string beans
	Snow peas (chicharo)	

a.4. Fruit Vegetables

Example:	Eggplant	Tomato
	Okra	Sweet Pepper

a.5. Flower Vegetables

Example:	Cauliflower	Broccoli
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a.6. Vine Fruits Vegetables

Example: Squash	Cucumber	Ampalaya
Upo	Patola	Sayote

a.7. Tree Fruits Vegetables

Example: Malunggay Camansi

B. According to Family/Method of Culture

1. Brassica/Leafy – Cauliflower, broccoli, cabbage
2. Cucurbits – have tendrils and vines
Ex. ampalaya, cucumber, upo, patola, squash, watermelon, honeydew, muskmelon
3. Legumes - presence of pods
Ex. String beans, munggo snow peas
4. Solanaceous – tomato, eggplant, pepper

Purpose of vegetables production

1. Backyard/homeyard production – for home consumption
2. Community/school gardening – nutrition gardening
3. Commercial production
 - Market gardening – production of vegetables for near market/fresh cuts (intensive production to meet demand)
 - Truck farming – large-scale production intended for outside market
 - Seed production
 - Processing – intended for processing like tomato, pepper, cucumber
 - Vegetable forcing – “protective cultivation” (Off season production to take advantage of the premium price)

Cultural management/approaches

1. Organic Farming – using organic sources of inputs (fertilizer & pesticide)
2. Integrated Crop Management – using the combination of inorganic (commercial) and organic input (fertilizer & pesticide)

Factors affecting vegetable crop growth & development

1. Environmental factors (Abiotic)
 - a. Soil and fertility – loam soil, ph 5.5 – 6.8
 - b. Water
 - c. Sunlight
 - d. Temperature and relative humidity
 - e. Wind velocity
2. Biological factors (Biotic)
 - a. weeds
 - b. insect pest and pathogenic micro organisms
 - c. animals/man
3. Cultural management and practices
 - a. Site selection (source of water, open field, good soil structure, topography, accessibility)
 - b. Varietal selection
 - c. Land preparation
 - d. Seedling Production
 - e. Care and management (water management, weed management, fertilizer management, pest and diseases management)
 - f. Harvest maturity indices & harvesting procedures

Soil Mixture:

1. For loam soil: one (1) part loam soil plus one (1) part compost (composted manure) plus 1 part rice hull or coconut coir dust.
2. For clay soil: one (1) part clay soil plus 2 parts compost (composted manure) plus 1 part of rice hull or coir dust.

It is recommended that the soil mixtures are sterilized to kill soil-borne pathogens, thus producing disease free seedlings

Soil Sterilization

- Before sowing the seeds, sterilize first the soil to kill weeds and pathogens.

Ways of soil sterilization:

1. Seedbed/plot

- ☞ Spread rice straw or rice hull, on top of the seedbeds and burn slowly.
- ☞ Drench seedbed with boiling water to sterilize



- **Reminders:** Water seedbed first for better heat penetration. When the soil cools, remove unburned materials and excess ash. Do not sow seeds immediately after sterilization to avoid toxic effects of burned materials.

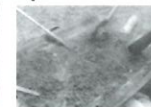
2. Soil mixture

- ☞ Prepare the sowing medium by mixing one part compost, one part carbonized rice hull (CHR) and one part garden soil (1:1:1).
- ☞ Sterilize mixture by roasting or drenching with boiling water.

Pagsterilize sa yuta



Panit sa humay



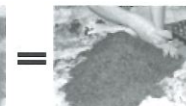
sinagol nga yuta ug biya sa hayopan



inuling nga panit sa humay



i-sterilize nga yuta ug biya sa hayopan



sinagol nga yuta



pagbutang sa seedling tray

Sowing of Seeds

1. Direct seeding

Transplanting or direct-seeding depends on the characteristics of the particular vegetable crop.

- ☞ Large seeds – the seedlings produced from these seeds are large and grow fast
- ☞ For crops which are sensitive to transplanting such as carrots and radish – to avoid damage of top roots during transplanting
- ☞ Plants with slow root regeneration – legumes

Generally, plants belonging to the solanaceae and brassicaceae families, except radish can be transplanted while legumes, sweet corn and vegetables with edible tap root such as carrots, radish, etc. may be directly sown.

2. Sowing in seed box, seed bed seedling tray

• Seed box, seed bed, cellular tray

- ☞ Seed box: Can be made of wood/plywood measuring 50 cm long, 33 cm wide and 7 cm deep. Painting with coal tar should be done to make it durable and withstand rotting. It should be filled up to the edge with sterilized soil.

- Seedbed: seedbed must be thoroughly prepared and its surface sterilized whether by burning rice straw over it or by using chemicals. Rows should be made 5-7 cm apart.

- Cellular seedling tray: Can be of plastic cardboard. Drop 2-3 grains of complete fertilizer (14-14-14) in each tray hole before filling with the soil mixture. Fill the seedling tray holes with the mixture and slightly compact it using our palm.



Advantage of using seedling tray

- economical in terms of seed usage
- uniformity of seedling growth
- minimize/eliminate seedling stress during transplanting
- handy – easy to transport
- gives aeration to the root system

Care of seedlings

- One week after the seedlings have emerged, fertilization must be applied to supply the needed nutrients of the plant. The common practice is the use of starter solution – a highly soluble fertilizer dissolved in water at the recommended rate and is usually applied during transplanting to promote a good start. The most commonly used starter solution is ammonium sulfate (21-0-0) at the rate of 1 tablespoon dissolved in 1 gallon of water. Complete fertilizer (14-14-14) at the rate of 24 grams per 10 liters of water can be used as substitute.

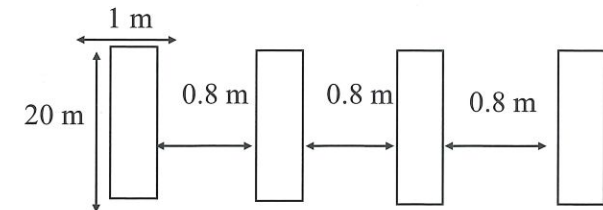
Land preparation and field lay-outing (plot/bed)

- In lay-outing, it is ideal that the plot must be at east-west direction to maximize utilization of sunlight and minimize shading among plants.
- Plow and harrow 2 to 3 times alternately at one week interval to a depth of 15 to 20 cm. A well-pulverized soil promotes good soil aeration and enhances root formation.

(Plot/Bed)

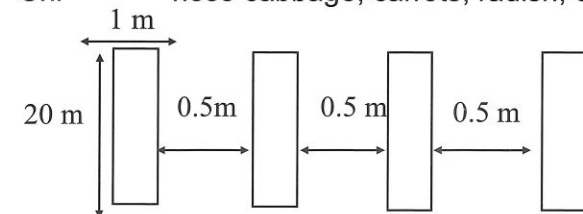
a. Solanaceous crops

Ex. eggplant, tomato, sweet pepper, etc)



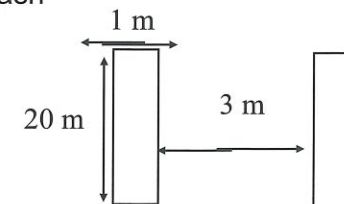
b. Brassica/crucifers/leafy /root vegetables

Ex. Cabbage, cauliflower, broccoli, pechay, kangkong, Chines cabbage, carrots, radish, etc)

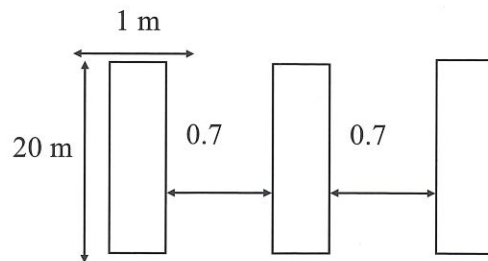


c. Cucurbits

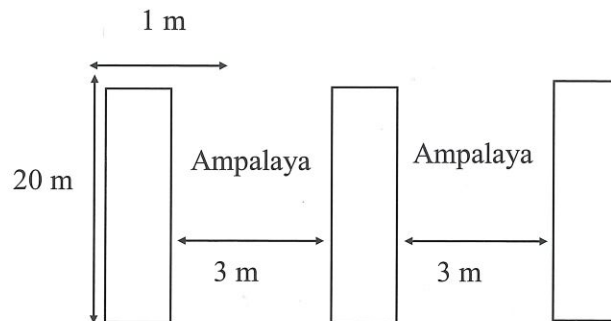
1. Crawling type - ex. Watermelon muskmelon, squash



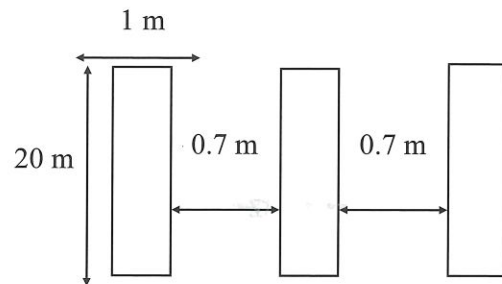
2. Trellis Type - ex. Muskmelon, honeydew, cucumber



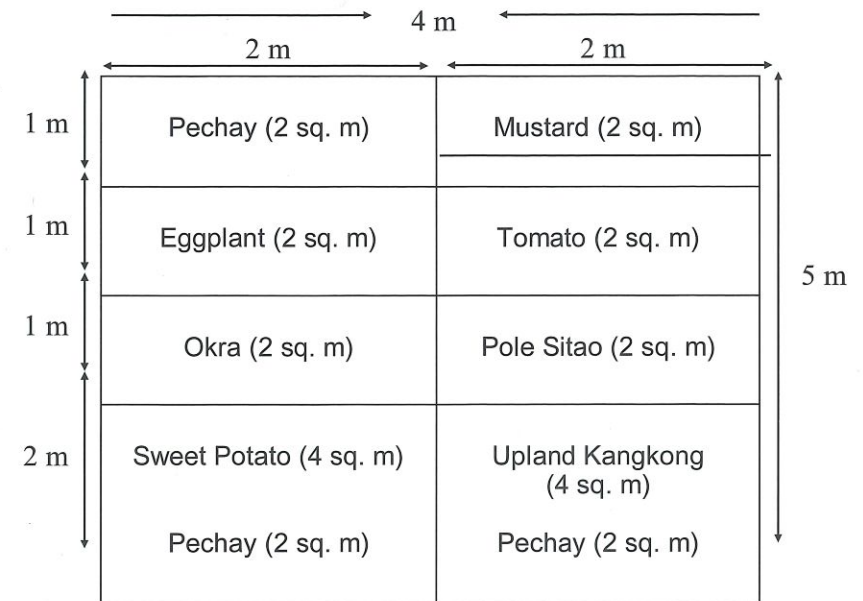
3. Trellis Type - ex. Ampalaya, upo, patola



d. Legumes



For home or school garden (10 sq. meter)



MULCHING

Mulching controls weeds, conserves soil moisture, prevents soil erosion and leaching of fertilizers and reflects sunlight to repel insect pests from hiding under the leaves.

Installing the plastic mulch

1. Water the plot before installing the plastic mulch.
2. Stretch the plastic mulch over the planting bed, with the silver color on top.
3. Fasten edges of the mulch to the soil with bamboo slats spaced at 30 cm apart. Cover edges with soil.



Making holes

1. Use a tin can with holes at the side and bottom of the can. Attach a wooden handle or bamboo pole. Fill the can with burning charcoal then punch into the plastic mulch following the recommended planting distance.



Note: If plastic mulch is not available, you can use indigenous materials available such as rice hull, rice straw and coconut coir dust..

CULTURAL PRACTICES OF DIFFERENT VEGETABLES

EGGPLANT (*Solanum melongena esculentum*)

- Site Selection
 - ☞ Requires direct sunlight and thrives best in sandy loam and clay loam soil with a pH ranging from 5.5 to 7.0.
 - ☞ Moderately sensitive to flooding and moisture sensitive during flowering and fruit enlarging.
- Selection of Varieties
 - ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.
- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow 2 or 3 times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply basal fertilizer. Install the plastic mulch (*refer to mulching technique*).
- Seedbed Preparation & Seed Sowing
 - ☞ For one (1) hectare area, construct five (5) seedbeds measuring 1 m wide x 10 m height at 15 cm high.



- ☞ Pulverize the soil.
- ☞ Sterilize the seedbed (*refer to soil sterilization*).
- ☞ Wet the seedbed and sow seeds at approximately 5 seeds per linear meter and cover them lightly with soil. Five days after emergence, the seedlings should be pricked in small pots using rolled banana leaves. Use only one seedling per pot.
- ☞ For seedling trays: Fill the holes of the tray with the sterilized potting medium and slightly compact it using your palm. Sow one seed per hole of the seedling tray. Cover with fine soil. Sprinkle with water.

Reminder: Soak the seeds in clean water a night before sowing. Sow the seeds immediately or air dry the seeds before sowing.

- Seedling Care
 - ☞ Protect seedlings from excessive sunlight and rain by providing temporary shelter.
 - ☞ Water seedling in the morning or afternoon.
 - ☞ Drenched the seedling with starter solution (*refer to care of seedlings*).
 - ☞ One week before transplanting, harden the seedling by gradually exposing them to sunlight to minimize planting shock.
- Transplanting
 - ☞ Seedling is ready for transplanting 4-6 weeks from sowing or seedlings have already 3 to 4 true leaves.
 - ☞ Plant only one seedling at a distance of 60-70 cm per hill and 50 cm per row. Water newly transplanted seedlings and replant dead hills.
 - ☞ Transplant during cloudy days or late afternoon to avoid transplanting shock.
 - ☞ Provide one (1) meter long stake to prevent lodging.
- Fertilizer Application per 20m Length Plot
 - ☞ Basal fertilizer: one (1) sack organic fertilizer (chicken dung), four (4) kls complete fertilizer (14-14-14), one (1) kilo urea (46-0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate.

Cover the fertilizer with soil or mix them thoroughly with the soil.

☞ Drenching:

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	-	75 grams
4th week	-	150 grams
5th week	-	225 grams
6th week	-	300 grams

• Irrigation

- ☞ Irrigate the seedbed two days before transplanting to cool down the soil under the plastic mulch and to dissolve the fertilizers applied.
- ☞ Water the plants immediately after transplanting and repeat as often as needed.

Note: Mulched eggplant requires less water.

• Weeding

- ☞ Manage weeds by hand weeding or by off-baring at 14 days after transpalting (DAT) and by hilling up at 21 DAT.

• Pruning

- ☞ Pruning is necessary for plant growth and development. Remove lateral branches or shoots up to the fork. Pruning also reduces competition in nutrient absorption.

• Insect Pest and Diseases

- ☞ Insect pests that commonly attack eggplant are fruit worm, fruit & shoot, aphids, white flies, flea beetle, Lady

Beetle and cutworm. Diseases, on the other hand are early blight, late blight, fusarium wilt, blossom-end rot and mosaic virus.

- ☞ To minimize pest incidence, avoid monocropping. Intecrop with other vegetables or legumes.
- ☞ Can be manged by using high resistant varieties, cultural, biological and chemical control measures.

• Harvesting

- ☞ Harvesting starts 46—50 days after transplanting (DAT) depending on the variety. Harvest fruits that are still tender and young. Harvesting can be done twice a week over a period of 3-6 months.
- ☞ Remove damaged fruits from the harvest and sort according to market standards.

TOMATO (*Lycopersicum esculentum*, Miller)

• Site Selection/Soil Type

- ☞ Can be grown in any type of soil, from sandy loam to clay loam with pH range from 5.5.to 8.0. However, tomatoes need a well-drained soil, warm weather and constant sunshine for high yield and better quality.



• Selection of Varieties

- ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.

• Land Preparation (*refer to land preparation & field lay-outing*)

- ☞ Lands planted with solanaceous crops in the previous season should be avoided.
- ☞ Plow and harrow two (2) or three (3) times alternately at one week interval at a depth of 15 cm to 20 cm. A well-pulverized soil promotes good soil aeration and enhances root formation.
- ☞ Prepare the plots at 1m wide x 20m length. Apply basal fertilizer. Install the plastic mulch. (*refer the mulching technique*)

- Seedbed Preparation & Seed Sowing
 - ☞ For one (1) hectare area, construct seedbed measuring one (1) m wide x 10 m height at 15 cm high. Pulverize the soil.
 - ☞ Sterilize the seedbed (*refer to soil sterilization*).
 - ☞ Sow seeds and cover them lightly with soil. Water the seedbed for the first three days until the seeds germinate. Five days after emergence, the seedlings should be pricked in small pots using rolled banana leaves. Use only one seedling per pot.
 - ☞ For seedling trays: Fill the holes of the tray with the potting medium and slightly compact it using your palm. Sow one seed per hole of the seedling tray. Cover with fine soil. Sprinkle with water.

- **Reminder:** Soak the seeds in clean water a night before sowing. Sow the seeds immediately or air dry the seeds before sowing.

- Seedling Care
 - ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.
 - ☞ Water seedling in the morning or afternoon.
 - ☞ Drenched the seedling with starter solution (*refer to care of seedlings*).
 - ☞ One week before transplanting, harden the seedling by gradually exposing them to sunlight to avoid transplanting shock.

- Transplanting
 - ☞ Three to four weeks old seedling can already be transplanted. Plant 1-2 seedling at 60-70 cm distance between hills and 50 cm between rows.
 - ☞ To avoid breaking the stem during transplanting, hold the roots with the thumb and forefinger then push towards the soil at 3-5 cm deep depending on the length of the stem.
 - ☞ Press the soil firmly around the roots and irrigate it using a sprinkler. Replant the missing hills.
 - ☞ Transplant during cloudy days or late afternoon to avoid

transplanting shock. Cover newly planted seedlings with banana stalk or any available material for covering.

- Fertilizer Application per 20 Linear Meter
 - ☞ Basal fertilizer: One (1) sack organic fertilizer (chicken dung), four (4) kls complete fertilizer (14-14-14), one (1) kilo urea (46-0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate. Cover the fertilizer with soil or mix them thoroughly with the soil

- ☞ Drenching:

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	-	75 grams
4th week	-	150 grams
5th week	-	225 grams
6th week	-	300 grams

- Trellising
 - ☞ Support the transplanted seedlings with trellis at 15 days after transplanting using locally available materials like bamambo or ipil-ipil and plastic straw or nylon used in tying and vine training.



- Irrigation
 - ☞ Water the plants when necessary. Plant need sufficient mositure from the early stage og growth until the fruiting stage.

- Weeding
 - ☞ Remove the weeds by off-barring at 14-21 days after transplanting (DAT) and by hilling-up at 28-35 DAT.
- Insect Pests and Diseases
 - ☞ Insect pests that commonly attack tomato are thrips, whiteflies and fruitworm. Diseases, on the other hand mosaic virus bacterial wilt and nematodes.
 - ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.
- Harvesting
 - ☞ Harvesting starts at 55 to 65 DAT.
 - ☞ Tomatoes are harvested at several stages depending on how they are to be marketed or used. Harvest early morning.

AMPALAYA (*Momordica charantia*)

- Site Selection/Soil Type
 - ☞ Can be grown in any type of soil but preferably the sandy or clay loam with good drainage, high organic matter with pH ranging from 5 to 6.7.
- Selection of Varieties
 - ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.
- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Soil must be well-pulverized and leveled to obtain maximum yield.
 - ☞ Plow and harrow the field at seven (7) days interval.
 - ☞ Prepare the plots at 1m wide x 20m length. Apply basal fertilizer.



• Planting

Direct planting:

- ☞ Plant one (1) seed per hill at a distance of 80-100 cm between hills with a crawling area of three (3) meters wide.

Seed Sowing

- ☞ Crack or cut the tip of the seed. Soak the seeds in clean water for 30 minutes to 1 hours.
- ☞ Fill the holes of the tray with the potting medium and slightly compact it using your palm. Sow one seed per hole with the embryo facing down. Cover with fine soil. Sprinkle with water.
- ☞ Protect seedlings from excessive sunlight and rain by providing temporary shelter.

• Seedling Care & Transplanting

- ☞ Protect seedlings from excessive sunlight and rain by providing temporary shelter.
- ☞ Water seedling regularly, when needed.
- ☞ Harden the seedling by gradually exposing them to sunlight.
- ☞ Drench the seedling with starter solution (*refer to care of seedlings*).
- ☞ Seedlings are ready for transplanting after 10-15 days (DAS) or when true leaves developed.
- ☞ Transplant during cloudy days or late afternoon to avoid transplanting shock.
- ☞ Replant missing hills.



- Trellising
 - ☞ Trellis provide support to climbing vegetables and promote good quality fruits.
 - ☞ Construct trellis at a distance of 3.0 wide and 1.5m to 2 m high using bamboo or wooden post. Intertwined with wire or nylon twine in crosswise and lengthwise direction both at the top and side of the trellis as climbing support for ampalaya.
- Fertilizer Application per 20 Linear Meter
 - ☞ Basal Fertilizer: One (1) sack organic fertilizer (chicken dung), four (4) kls complete fertilizer (14-14-14), one (1) kilo urea (46-0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate. Cover the fertilizer with soil or mix them thoroughly with the soil
 - ☞ Drenching:

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	225 grams	75 grams
4th week	-	150 grams
5th week	-	225 grams
6th week	-	300 grams

- Pruning
 - ☞ Remove lateral vines and old leaves from the base up to 1 meter high. Maintain one or two lateral vines only.
- Irrigation
 - ☞ Irrigate when necessary during the growing period of the plant.
 - ☞ Ampalaya cannot tolerate water logging hence a drainage canal should be provided.

- Weeding and Cultivation
 - ☞ Off-barring at seven (7) to 10 days after planting followed by hilling up at 15-20 DAT after off-barring to control weeds.
 - ☞ Hand weed the base of the plants regularly to avoid nutrient competition.
- Insect Pest and Diseases
 - ☞ Insect pests that commonly attack ampalaya are beetle, cucurbit bugs, fruit fly, thrips, leaf miner, mites, aphids, white flies, cutworm and root grub. Diseases, on the other hand are damping-off, anthracnose, powdery mildew, bacterial wilt, cercospora leaf spot, mosaic, fusarium wilt and root knot.
 - ☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
 - ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.
- Maturity
 - ☞ Harvest fruits 18 to 20 days after blooming or when the fruits green, shiny and have attained full size.
 - ☞ Harvesting can be done continuously for 2-3 months,

Squash (*Cucurbita maxima* L.)

- Soil and Climatic Requirements
 - ☞ Can be grown in any type of soil but performs best in well-drained sandy loam with pH ranging from 5.5 to 6.5.
 - ☞ Requires a relatively dry warm climate which is essential for fruit setting



- Selection of Varieties
 - ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.

- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow 2 or 3 times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply the basal fertilizer. Install the plastic mulch. (*refer the mulching technique*).
 - ☞ Zero tillage can also be applied. Before planting, clear the area by removing the weeds manually. Dig holes at a depth of 10 cm with a distance of 3 m x 3 m. Pulverize the soil where the seeds will be sown

- Planting

Direct planting:

- ☞ In single row, plant 2-3 seed per hill at a distance of 80 cm—1.0 m between hills with a crawling area of 3 meters wide.
- ☞ Cover the seeds with thin layer of soil.



Seed Sowing

- ☞ Fill the plastic tray with the potting medium and slightly compact it using your palm. Sow one seed per hole with the tip of the seeds facing downwards. Cover with fine soil. Sprinkle with water.

- Seedling Care & Transplanting

- ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.
- ☞ Water seedling regularly, when needed.
- ☞ Harden the seedling by gradually exposing them to sunlight.

- ☞ Seedlings are ready for transplanting after 10-15 days or when true leaves developed.
- ☞ Transplant during cloudy days or late afternoon to avoid transplanting shock.
- ☞ Replant missing hills.

- Fertilizer Application

- ☞ Basal Fertilizer: One (1) sack organic fertilizer (chicken dung), four (4) kls complete fertilizer (14-14-14), one (1) kilo urea (46-0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate. Cover the fertilizer with soil or mix them thoroughly with the soil

- ☞ Drenching:

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	-	75 grams
4th week	-	150 grams
5th week	-	225 grams
6th week	-	300 grams

- Pruning/Thinning

- ☞ Starts pruning as soon as lateral vines appear (10-15 DAT).
- ☞ Remove shoots from the 5th node and below. Fruiting takes place from the 6th nodes onwards.
- ☞ Remove all deformed fruits while still samll to avoid nutrient competition.
- ☞ Place 5 to 6 cm thick of bedding materials like rice straw, rice hull, etc beneath the good fruits to prevent rotting of the fruits.

NUTRITIONAL VALUE OF SOME VGETABLES PER 100 GRAM EDIBLE PORTION

PROPERTIES	EGG PLANT	TOMATO	AMPALAYA	SQUASH	STRING BEANS	OKRA	PEPPER	PECHAY	KANG KONG	UPO
Protein (g)	1.0	0.9	1.0	1.0	3.0	2.0	0.86	1.6	3.0	0.5
Fat (g)	0.19	0.2	0.17	0.1	0.5	0.1	0.17	0.2	0.3	0.1
Fiber (g)	3.40	1.2	2.80	2.0	1.3	3.2	1.7	1.0	1.0	
Carbohydrates (g)	5.7	3.9	3.70	11.69	5.2	7.03	4.64	4.0	5.0	3.5
Calcium (mg)	9	10	19	48	64.0	81	10	22.0	81.0	16.0
Iron (mg)	0.24	0.3	0.43	0.70	1.3	0.80	0.34	0.9	3.3	0.4
Vit.A	27 IU	833 IU	471 IU	10630 IU	167.0 IU	375 IU			4000-10000 IU	10.0 IU
Niacin (mg)	0.649	0.594	0.400	1.2		1.0	0.480	0.7		0.4
Vit C (mg)	2.2	13	84	21	28.0	21.1	80.4	6.0	30.0-130.0	11.0
Energy Value (kj)	24	18	17	45		31	84			
Phosphorous (mg)		24		33	54.0	63	20			14.0
Sodium (mg)	2.0	5.0	5	4.0		8				
Potassium (mg)	230	237.0	296	352			175			
Magnesium	0.250	11	17	34		57	10		52.0	



- Irrigation
 - ☞ Irrigate once a week or when necessary.
- Weeding
 - ☞ Remove weeds in between plants.
- Insect Pest and Diseases
 - ☞ Insect pests that commonly attack squash are squash beetle, cucurbit bugs, fruit fly, thrips, leaf miner, mites, aphids, white flies, cutworm and root grub. Diseases, on the other hand, are damping-off, alternaria leaf spot, downy mildew, anthracnose, powdery mildew, bacterial wilt, cercospora leaf spot, mosaic, fusarium wilt and root knot.
 - ☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
 - ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.
- Maturity
 - ☞ Fruit can be harvested at 55-60 DAT or just before the fruits are fully ripe or when the peduncle starts to dry.
 - ☞ It can also be harvested immature when it is to be cooked with the skin intact.

String Beans (*Vigna unguiculata*) (pole/bush type)

- Soil and Climatic Requirements
 - ☞ Can be grown in any type of soil but performs best in well-drained sandy loam with pH ranging from 5.5 to 6.8.
 - ☞ Can be grown throughout the year.
- Selection of varieties
 - ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.



- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow 2 or 3 times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply the basal fertilizer. Install the plastic mulch. (*refer the mulching technique*)
- Planting
 - ☞ Plant in double rows with 2 to 3 seeds per hill at 1 cm deep using the recommended planting distance.
 - ☞ Cover the seeds lightly soil.
- Spacing

Bush Sitao

 - ☞ 50-75 cm between rows and 25-30 cm between hills

Pole Sitao

 - ☞ 1.0 m between rows and 30-50 cm between hills.

- Trellising
 - ☞ Provide stake for pole sitao when the plants begin to climb or 25 days after emergence (DAE).
 - ☞ Place 1.5 to 2 meters long stakes between plants in slanting position so that the top of the stakes intersects each other.
 - ☞ Train the pole sitao to climb the trellis as they grow.



- Fertilization
 - ☞ Basal Fertilizer: One (1) sack organic fertilizer (chicken dung), 3 kls complete fertilizer (14-14-14), 2 kilo urea (46-0-0). Cover the fertilizer with soil or mix them thoroughly with the soil
 - ☞ Drenching:

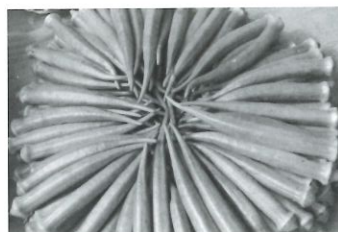
Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	-	75 grams
4th week	-	150 grams
5th week	-	225grams

- Irrigation
 - ☞ Water the plants immediately after planting to ensure uniform germination. Frequency of irrigation depends on soil type and weather condition.
- Weeding
 - ☞ Remove the weeds especially around the base of the plant.
- Insect Pests and Diseases
 - ☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
 - ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.
- Harvesting
 - ☞ Harvest the pods when they are still green and immature.
 - ☞ Harvest twice a week, in the morning or late afternoon.

Okra (*Hibiscus esculentus* L.)

- Soil and Climatic Requirements
 - ☞ Okra grows well in any type of soil but grows best in sandy loam with pH ranging from 5.5 to 7.0.



- Selection of Varieties
 - ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.
- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow two (2) or three (3) times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply the basal fertilizer. Install the plastic mulch. (*refer the mulching technique*)
- Planting

Direct:

 - ☞ Plant two (2) to three (3) seeds per hill at 30 cm between hills and 75 cm distance between rows.
 - ☞ Replant missing hills immediately.
 - ☞ Thin the plants to two (2) seedlings per hill 15 days after planting.
 - **Reminder:** Soak the seeds in clean water a night before sowing. Sow the seeds immediately or air dry the seeds before sowing.
- Irrigation
 - ☞ Water the plants regularly whenever the soil is dry or the plants show wilting.
- Fertilization
 - ☞ Basal Fertilizer: One (1) sack organic fertilizer (chicken dung), 3 kls complete fertilizer (14-14-14), 2 kilo urea (46-0-0). Cover the fertilizer with soil or mix them thoroughly with the soil
 - ☞ Drenching

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	-	75 grams
4th week	-	150 grams
5th week	-	225grams

- Weeding/Cultivation
 - ☞ Off-bar the plants at 15 days after emergence to control weeds. Hill-up one month after or 15 days after off-barring to cover the base of the after plants.
 - ☞ Remove remaining weeds between plants to avoid nutrient competition.
- Insect Pest and Diseases
 - ☞ Insect pests that commonly attack okra are squash cotton stainer and stink bug. Diseases, on the other hand are cercospera blight, powdery mildew, fruit rot and root knot nematode.
 - ☞ Uproot and bury infected plants and maintain the cleanliness of the field.
 - ☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
 - ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.
- Harvesting
 - ☞ Okra starts to flower 40-75 days after planting. Young and tender fruits can be harvested 4-6 days from flowering.
 - ☞ Harvest fruits that measures 3-4 inches long at 2 to 3 days interval.

Sweet Pepper (*Capsicum annuum* L.)

- Site Selection/Soil Type
 - ☞ Can grow in any type of soil with a pH of 5.5—6.5.

- ☞ Thrives best in sandy loam and clay loam soil with plenty of organic matter, with sufficient moisture and good drainage.



- Selection of Varieties
 - ☞ Choose varieties that are high yielding, resistant to pests and diseases, adaptable to local climatic conditions and acceptable to the consumer.
- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow two (2) or three (3) times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply basal fertilizer. Install the plastic mulch (*refer to mulching technique*).
- Seedbed Preparation & Seed Sowing
 - ☞ For one (1) hectare area, construct seedbed measuring 1 m wide x 10 m height at 15 cm high. Pulverize the soil.
 - ☞ Sterilize the seedbed (*refer to soil sterilization*).
 - ☞ Sow the seeds and cover them lightly with soil.
 - ☞ For seedling trays: Fill the holes of the tray with the sterilized potting medium and slightly compact it using your palm. Sow one or two seed per hole of the seedling tray. Cover with fine soil. Sprinkle with water.
- **Reminder:** Soak the seeds in clean water a night before sowing. Sow the seeds immediately or air dry the seeds before sowing.
- Seedling Care
 - ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.
 - ☞ Water seedling in the morning or afternoon.
 - ☞ Drenched the seedling with starter solution (*refer to care of seedlings*).
 - ☞ One week before transplanting, harden the seedlings by gradually exposing them to sunlight.

- Transplanting
 - ☞ Seedling is ready for transplanting 28-42 days from sowing or seedlings have already 3 to 4 true leaves.
 - ☞ Plant one seedling per hill at 75-100 cm distance per hill and 50 cm distance between rows. Water newly transplanted seedlings and replant dead hills.
 - ☞ Transplant during cloudy days or late afternoon to avoid transplanting shock.

- Fertilizer Application per 20m Length Plot

- ☞ Basal fertilizer: one (1) sack organic fertilizer (chicken dung), 4 kls complete fertilizer (14-14-14), 1 kilo urea (46-0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate. Cover the fertilizer with soil or mix them thoroughly with the soil.

- ☞ Drenching:

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	225 grams	
4th week	300 grams	150 grams
5th week	-	225 grams
6th week	-	300 grams

- Irrigation
 - ☞ Irrigate the seedbed two days before transplanting to cool down the soil under the plastic mulch and to dissolve the fertilizers applied.
 - ☞ Water the plants immediately after transplanting and repeat as often as needed.
- Weeding
 - ☞ Manage weeds by hand weeding or by off-baring at 10 days after transplanting (DAT) and by hilling up at 30 DAT.

- Insect Pests and Diseases
 - ☞ Insect pests that commonly attack pepper are aphids, spider mites and leaf hoppers while common diseases include bacterial wilt and anthracnose.
 - ☞ Uproot and bury infected plants. Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
- Harvesting
 - ☞ Harvesting starts 46—50 days after transplanting (DAT) depending on the variety. Harvest fruits that are still tender and young. Harvesting can be done twice a week over a period of 3-6 months.
 - ☞ Remove damaged fruits from the harvest and sort according to market standards.

Pechay (*Brassica napus* L) / Mustard (*Brassica campestris*)



- Site Selection
 - ☞ Grows best in an area with clay loam soil with high organic matter, having a pH of 6.0 to 6.8.
- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow two (2) or three (3) times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply basal fertilizer. Install the plastic mulch. (*refer the mulching technique*)
- Seedbed Preparation and Seed Sowing
 - ☞ For seedbed: Construct seedbed measuring 1 m wide x 10 m height at 15 cm high. Pulverize the soil.
 - ☞ Sow seeds in sterilized seedbed (*refer to soil sterilization*) and cover them lightly with soil.
 - ☞ For seedling trays: Fill the holes of the tray with the sterilized potting medium and slightly compact it using

your palm. Sow two-three (2-3) seeds per hole of the seedling tray. Cover with fine soil. Sprinkle with water.

- Seedling Care
 - ☞ Protect seedlings from excessive sunlight and rain by providing temporary shelter.
 - ☞ Water seedlings in the morning or afternoon.
 - ☞ Five days after emergence, the seedlings should be pricked in small pots using rolled banana leaves. Use only one seedling per pot.
 - ☞ Drenched the seedling with starter solution (*refer to care of seedlings*).
 - ☞ Harden the seedling one week before transplanting by gradually exposing them to sunlight.
- Transplanting
 - ☞ Seedling is ready for transplanting 10-15 days from sowing or seedlings have already 1 to 2 true leaves.
 - ☞ In quadruple rows, plant one seedling at a distance of 20x20 cm per hill. Water newly transplanted seedlings and replant dead hills.
- Fertilizer Application per 20m length plot
 - ☞ **Basal fertilizer:** one (1) sack organic fertilizer (chicken dung), 1 kls complete fertilizer (14-14-14) and 4 kilo urea (46-0-0). Cover the fertilizer with soil or mix them thoroughly with the soil.

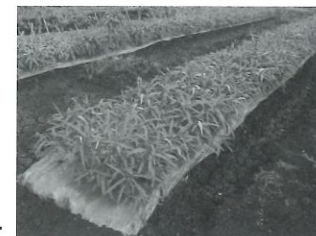
☞ **Drenching:**

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea
1st week	75 grams
2nd week	150 grams
3rd week	225 grams
4th week	300 grams

- Irrigation
 - ☞ Water the plants immediately after transplanting and repeat daily.
- Insect Pests and Diseases
 - ☞ Insect pests that commonly attack pechay/mustard are aphids, flea beetles and diamond backmoth.
 - ☞ Uproot and bury infected plants. Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
- Harvesting
 - ☞ Harvesting can be done 3—4 weeks after transplanting (DAT).
 - ☞ Cut off with a sharp knife or pull together with the roots and wash.

Kangkong (*Ipomoea aquatic Forsk.*)



- Site Selection
 - ☞ Can be grown in any type of soil like sandy loam with good drainage, high organic matter with a pH ranging from 5.5 to 6.5.
- Land Preparation (*refer to land preparation & field lay-outing*)
 - ☞ Plow and harrow two (2) or three (3) times alternately at one week interval at a depth of 15 cm to 20 cm.
 - ☞ Prepare the plots/beds at 1 m wide x 20 m length. Apply basal fertilizer. Install the plastic mulch. (*refer the mulching technique*)
- Planting
 - ☞ Direct Planting
 - ☞ In quadruple rows, sow 2-3 pieces of seeds per hill at a planting distance of 20cm between rows and hills.
 - ☞ Can also be sown directly in containers.
- Fertilizer Application per 20m length plot
 - ☞ **Basal fertilizer:** one (1) sack organic fertilizer (chicken

dung), 1 kls complete fertilizer (14-14-14) and 4 kilo urea (46-0-0). Cover the fertilizer with soil or mix them thoroughly with the soil.

☞ Drenching:

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea
1st week	75 grams
2nd week	150 grams
3rd week	225 grams
4th week	300 grams

- Irrigation
 - ☞ Water the plants after planting and repeat daily.
- Insect Pests and Diseases
 - ☞ Insect pests that commonly attack kangkong are caterpillars, whiteflies and aphids.
 - ☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
 - ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.
- Harvesting
 - ☞ Harvesting can be done 3—4 weeks after planting (DAT) by cutting the shoots or uprooting.

Upo (*Lagenaria siceraria*)

- Site Selection/Soil Type
 - ☞ Can be grown in any type of soil from sandy to clay loam with good drainage, high organic matter with pH ranging from 5.8 to 6.8.



- Selection of Varieties
 - ☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.
- Land Preparation (*refer to land preparation & field layouting*)
 - ☞ Plow and harrow the field at seven (7) days interval.
 - ☞ Prepare the plots at 1m wide x 20m length with a crawling area of 3m wide. Apply basal fertilizer.
- Planting

Direct Planting:

 - ☞ Plant one seed per hill at a distance of 80-100 cm between hills with a crawling area of 3 meters wide.

Seed Sowing

 - ☞ Crack or cut the seed near its embryo.
 - ☞ Fill the holes of the tray with the potting medium and slightly compact it using your palm. Sow one seed per hole with the embryo facing down. Cover with fine soil. Sprinkle with water.
 - ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.
- **Reminder:** Soak the seeds in clean water a night before sowing. Sow the seeds immediately or air dry the seeds before sowing
- Seedling Care & Transplanting
 - ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.
 - ☞ Seedlings are ready for transplanting after 10-15 days (DAS) or when true leaves developed.
 - ☞ Drenched the seedling with starter solution (*refer to care of seedlings*).
 - ☞ Water seedling regularly, when needed.
 - ☞ Harden the seedling by gradually exposing them to sunlight.
 - ☞ Transplant during cloudy days or late afternoon to avoid transplanting shock.

☞ Replant missing hills

- Fertilizer Application per 20 Linear Meter

☞ Basal Fertilizer: One (1) sack organic fertilizer (chicken dung), 4 kls complete fertilizer (14-14-14), 1 kilo urea (46-0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate. Cover the fertilizer with soil or mix them thoroughly with the soil

☞ **Drenching:**

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	225 grams	75 grams
4th week	-	150 grams
5th week	-	225 grams
6th week	-	300 grams

- Pruning

☞ Remove the tip of the main vine and the lateral branches that appear in the main stem.

- Irrigation

☞ Irrigate when necessary during the growing period of the plant.

- Trellising

☞ Trellis provide support to climbing vegetables and promote good quality fruits.

☞ Construct trellis at a distance of 3.0 m wide and 1.5 m to 2 m high using bamboo or wooden post. Intertwined with wire or nylon twine in crosswise and lengthwise direction both at the top and side of the trellis as climbing support.

- Weeding and Cultivation

☞ Remove weeds 15 to 20 days after emergence and as needed.

☞ Hand weed the base of the plants regularly to avoid nutrient competition.

- Insect Pests and Diseases

☞ Insect pests that commonly attack upo are yellow beetle, fruit fly and leaf folder, while the most common diseases are downy mildew, powdery mildew, anthracnose and Cercospora leaf spot.

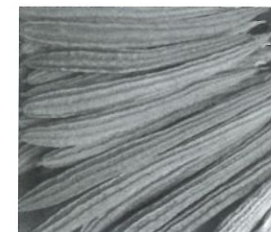
☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.

☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.

- Harvesting

☞ Harvest fruits once it reach maturity.

Patola (*Luffa cylindrica*)



- Site Selection/Soil Type

☞ Can be grown in any type of soil from sandy to clay loam with good drainage, high organic matter.

- Selection of Varieties

☞ Choose varieties that are high yielding, resistant to pest and diseases, adaptable to local climatic conditions and acceptable to the consumer.

- Land Preparation (*refer to land preparation & field lay-outing*)

☞ Plow and harrow the field at seven (7) days interval.

☞ Prepare the plots at 1m wide x 20m length with a crawling area of 3m wide. Apply basal fertilizer.

- Planting

Direct planting:

☞ Plant one seed per hill at a distance of 80-100 cm

between hills with a crawling area of three (3) meters wide.

Seed Sowing

- ☞ Crack or cut the seed near its embryo.
- ☞ Fill the holes of the tray with the potting medium and slightly compact it using your palm. Sow one seed per hole with the embryo facing down. Cover with fine soil. Sprinkle with water.
- ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.

- **Reminder:** Soak the seeds in clean water a night before sowing. Sow the seeds immediately or air dry the seeds before sowing

• Seedling Care & Transplanting

- ☞ Protect seedlings from excessvie sunlight and rain by providing temporary shelter.
- ☞ Seedlings are ready for transplanting after 10-15 days (DAS) or when true leaves developed.
- ☞ Drenched the seedling with starter solution (*refer to care of seedlings*).
- ☞ Water seedlings regularly, when needed.
- ☞ Harden the seedling by gradually exposing them to sunlight.
- ☞ Transplant during cloudy days or late afternoon to avoid transplanting shock.
- ☞ Replant missing hills

• Fertilizer Application per 20 linear meter

- ☞ Basal Fertilizer: One (1) sack organic fertilizer (chicken dung), 4 kls complete fertilizer (14-14-14), 1 kilo urea (46 -0-0), one handful of magnesium, one handful of boron and one handful of calcium nitrate. Cover the fertilizer with soil or mix them thoroughly with the soil

☞ **Drenching:**

Drenching can be done using 16 liters of water at 150 ml solution per hill.

Weeks	Urea	Complete fertilizer
1st week	75 grams	-
2nd week	150 grams	-
3rd week	225 grams	75 grams
4th week	-	150 grams
5th week	-	225 grams
6th week	-	300 grams

• Irrigation

- ☞ Irrigate when necessary during the growing period of the plant.

• Trellising

- ☞ Trellis provide support to climbing vegetables and promote good quality fruits.
- ☞ Construct trellis at a distance of 3.0 m wide and 1.5 m to 2 m high using bamboo or wooden post. Intertwined with wire or nylon twine in crosswise and lengthwise direction both at the top and side of the trellis as climbing support for ampalaya.

• Weeding and Cultivation

- ☞ Remove weeds 15 to 20 days after emergence and as needed.
- ☞ Hand weed the base of the plants regulary to avoid nutritent competition.

• Insect Pests and Diseases

- ☞ Insect pests are yellow beetle, fruit fly and lef folder, while the most common diseases are downy mildew, powdery mildew, anthracnose and Cercospora leaf spot.
- ☞ Practice good cultural management and sanitation to prevent insect pests damage and disease infection.
- ☞ Can be managed by using high resistant varieties, cultural, biological and chemical control measures.

• Harvesting

- ☞ Harvest fruits once it reach maturity.

Magna Carta of Women (R.A. 9710)

The RA 9710 or the Magna Carta of Women (MCW) of 2009 is a comprehensive women's human rights law that seeks to eliminate discrimination against women by recognizing, respecting, protecting, fulfilling and promoting the rights of Filipino women, especially those in the marginalized sectors.

What is discrimination against women?

- ▶ any gender-based distinction, exclusion, or restriction which has the effect or purpose of impairing or nullifying the recognition, enjoyment, or exercise by women, irrespective of their marital status, on the basis of equality of men and women, of human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field;
- ▶ any act or omission, including by law, policy, administrative measure, or practice, that directly or indirectly excludes or restricts women in the recognition and promotion of their rights and their access to enjoyment of opportunities, benefits, or privileges;
- ▶ a measure or practice of general application that fails to provide for mechanisms to offset or address sex or gender-based disadvantages or limitations of women, as a result of which women are denied or restricted in the recognition and protection of their rights and in their access to and enjoyment of opportunities, benefits, or privileges; or women, more than men are shown to have suffered the greater adverse effects of those measures or practices; and
- ▶ discrimination compounded by or intersecting with other grounds, status, or condition, such as ethnicity, age, poverty, or religion.

What are the rights of women guaranteed under the Magna Carta of Women?

All rights in the Philippine Constitution and those rights recognized under international instruments duly signed and ratified by the Philippines, in consonance with Philippine laws shall be rights of women under the Magna Carta of Women. These rights shall be enjoyed without discrimination since the law prohibits discrimination against women, whether done by public and private entities or individuals.

The Magna Carta of Women spells out the following rights:

- ▶ Protection from all forms of violence, including those committed by the State

- ▶ Protection and security in times of disaster, calamities and other crisis situations
- ▶ Participation and representation
- ▶ Equal treatment before the law
- ▶ Equal access and elimination of discriminating against women in education, scholarships and training
- ▶ Equal participation in sports
- ▶ Non-discrimination in employment in the field of military, police, and other similar services
- ▶ Non-discriminatory and non-derogatory portrayal of women in media and film
- ▶ Comprehensive health services and health information and education
- ▶ Special leave benefits
- ▶ Equal rights in matters relating to marriage and family relations

The Magna Carta of Women also guarantees the following civil, political and economic rights of women in the marginalized sectors:

- ▶ Food security and resources for food production
- ▶ Localized, accessible, secure, and affordable housing
- ▶ Decent work standards
- ▶ Employment, livelihood, credit, capital and technology
- ▶ Skills training
- ▶ Representation and participation
- ▶ Access to information
- ▶ Social protection
- ▶ Recognition and preservation of cultural identity and integrity
- ▶ Inclusion in discussions on peace and development
- ▶ Services and interventions for Women in Especially Difficult Circumstances
- ▶ Protection of Girl-Children
- ▶ Protection of Senior Citizens

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This image shows a full page of a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

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