

**Aasenso sa Green and Clean,  
FEDROW**

*(Family-based Ecological Diversion  
and Recycling of Waste)*

**Hands-on Training on Eco-Modular  
Production**

# Eco-Modular Planters

- Tube and Bag Planters with HDPE Trough
- Sub-Irrigated Planters (SIP)
- Wooden Grow-bed Stand with 20li to 40li SIP bucket
- Tower Garden
- Living Wall
- Hanging Baskets, Floating Garden, Solar-powered AMELIA, Isachar, Vermi-filtration Tank, Fiber Glass, Styrocrete, etc.

# TUBE AND BAG PLANTERS WITH HDPE TROUGH



- Tube planters are made of an industrial felt cloth (made of shredded PET bottles). The felt cloth is sown up into circular tubes and lengths of varying dimensions. Then, packs the tubes with a special horticultural mix.

# TUBE AND BAG PLANTERS WITH HDPE TROUGH

It can be used as vertical walls but as an attraction at roof top gardening. Rows of tube planters could work beautifully as transportable garden beds. And would be easier to maintain than dozens of containers.



# TUBE AND BAG PLANTERS WITH HDPE TROUGH

The HDPE plastic (High Density Poly-Ethylene) trough under the tube planter is the linear equivalent to a saucer under a potted plant. HDPE troughs are intended to support the tubes and to contain any excess water seepage, especially important when used on balconies, decks, etc. The trough itself is simply a catch basin and conversely, functions as a method of watering the planted tubes, as the water is wicked up into the soil in the tubes through capillary action.

# TUBE AND BAG PLANTERS WITH HDPE TROUGH

Tube planters are particularly well suited for roof top gardens. Water-proofing between tubes and roof is essential. Again, tubes in plastic troughs will accomplish this. Tubes placed next to each other will give a full 'garden-bed' feel, whether grasses, wildflowers, or natives to the area.

# TOOLS & MATERIALS NEEDED:

## **Tools/Equipments:**

High Speed Sewing Machine

Scissors

Meter

Square

Straight Edge

Saw

Hammer

Cordless Drill and drill bits

Soldering Gun

Plier stapler and staples

# TOOLS & MATERIALS NEEDED:

## Materials and Costs:

10 pcs Sewn Tube

Felt Cloth 5"-diam x 36"

@ PhP 200/pc

PhP 2,000.00

10 pcs 1 mm HDPE

Plastic Trough 5" x 32" x 2"

@ PhP 100/pc

PhP 1,000.00

10 pcs Sewn Bag

Felt Cloth 9" x 9"

@ PhP 200/pc

PhP 2,000.00

10 pcs 12"-diameter

plastic trough

@ PhP 50/pc

PhP 500.00

**TOTAL COST for one training**

**PhP 5,500.00**



# PROCEDURE:

## 1. Felt cloth tubes

- a. Measure and cut the felt cloth at 18” width and 3 ft or 36” length. And make 2 pieces 5”-diameter circle cloth.
- b. Sew the edges and attach the circles at both ends. Make sure that one end is still open enough to fill in the horticulture mix.
- c. When the tube is filled with mixture, place it in the HDPE Plastic trough and soak the tube with water. If the tube sags, fill-in additional mixture and soak with water until the tube is steady.
- d. Slit 2” holes at the top of the tube 10” apart. Insert healthy seedlings. Slightly water the seedlings and make sure that the trough is filled with water.

## PROCEDURE:

### 2. HDPE Plastic Trough (1mm High Density Polyethylene Plastic Liner)

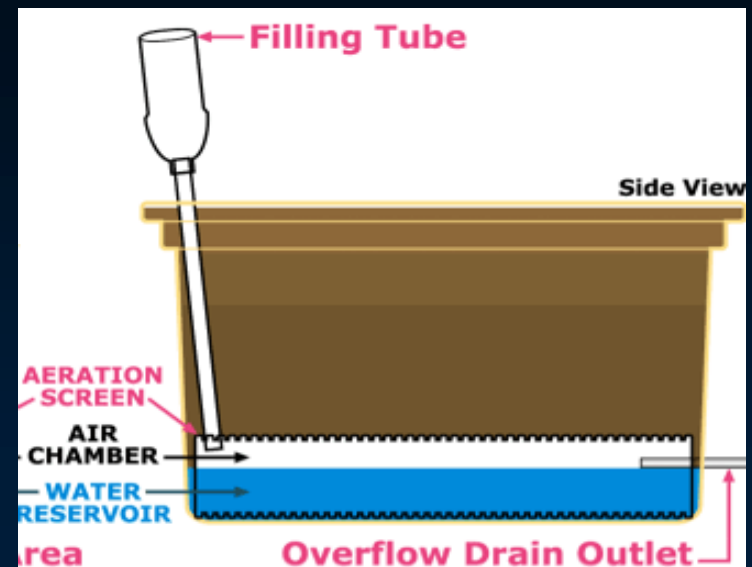
- a. Measure and cut the 1mm HDPE liner at 9" width and 36" length.
- b. Make a line of 2" distance around the perimeter making the inner rectangle 5" wide and 32" long.
- c. Fold the HDPE liner (to make it a trough for holding water) using heat gun according to 5" width and 32" length at the bottom.
- d. Staple the upper edge to secure the fold.
- e. Make 4 U-wire clips at 2" sides and 5" bottom and place them 9" apart to prevent the trough from collapsing when water is applied.

# SUB IRRIGATED PLANTER (SIP)



## Sub-Irrigated Planters (SIPs).

Currently, the main thrust in urban agriculture on growing vegetables and food production, but can be expanded to flowering plants, decorative plants and wall gardens.



# **SUB IRRIGATED PLANTER (SIP)**

**SIP is any method of watering plants where water is introduced from the bottom, allowing water to soak upwards to the plants through capillary action.**

**The system includes support plate, capillary wicks/mat, geotextile filter, overflow pipes, 4"-diam perforated pipes as composter column.**

# SUB IRRIGATED PLANTER (SIP)

## *Advantages:*

### **Space Saver:**

SIP is a 14” by 26” by 12” lightweight plastic planter. Can be set in a small space with sufficient sunlight like a balcony, patio, fire escape, roofdeck, etc.

### **Needs little attention:**

The system is self regulating. Can be left without watering for 2 to 3 weeks.

# SUB IRRIGATED PLANTER (SIP)

## *Advantages:*

### **Self fertilizing:**

**Two pieces of 4"-diameter perforated pipe 20" long are placed at the middle of the SIP into which kitchen scraps are placed. Inside, African Night Crawlers (ANC) leave nutrient-rich worm castings in their wake keeping the plants healthy.**

# TOOLS & MATERIALS NEEDED:

## **Tools/Equipment:**

Heat Gun

High Speed Sewing Machine

Scissors

Meter

Square

Straight Edge

Saw

Cordless Drill and drill bits

Soldering Gun

Plier stapler and staples

# TOOLS & MATERIALS NEEDED:

## Materials and Cost for Sub-Irrigated Planter (SIP):

70 liter Deco-Box with 5/16" hole overflow	- 14" x 26" x 12"	@ PhP400/pc
Perforated Plate/support	- 14" x 26" x 12"	@ PhP200/pc
4 pieces capillary mat/wick	- 2" x 16"	@ PhP 200/set
1 pc. Felt Cloth Filter	- 14" x 26"	@ PhP 200/pc
2 pcs 4"–diameter PVC perforated pipe	- 20" length	@ PhP 200/set

Total cost for single SIP: PhP 1,200

**For 1 training session, 5 SIP sets: 1,200 x 5: PhP 6,000.00**



# PROCEDURE:

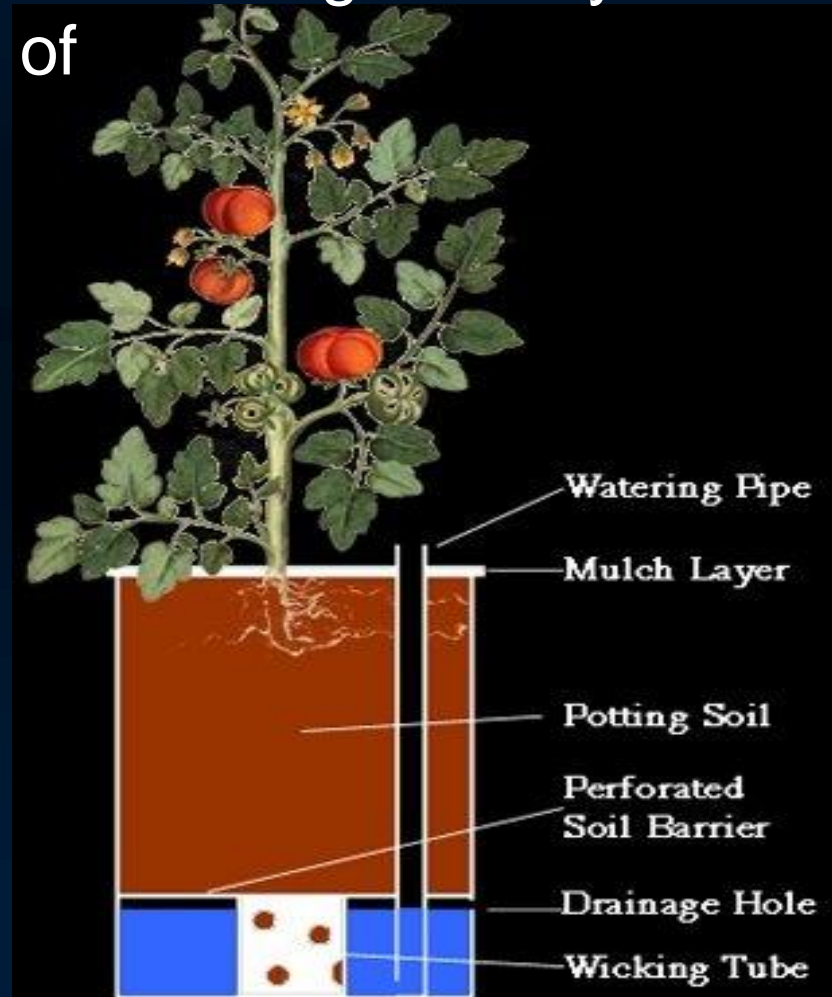
1. Secure a deco-box measuring 14" width, 26" length and 12" height, a lightweight plastic container with cover.
2. Cover. Measure and line a 2" distance from the edge of the deco-box cover making an inner rectangle having width of 11.5" width and 23.5" length.
3. Cut the 4 corners of the cover.
4. Bend the cover sides using heatgun.
5. Perforate or bore holes ( $3/16$ "") on the surface of the cover as the plate support/water reservoir.
6. Make 6 (six) 2" slits on the sides of the perforated plate for capillary mat/wick inserts.

## PROCEDURE:

7. Bore  $5/16$ " hole on the sides of the deco-box,  $2 \frac{1}{2}$ " above the bottom of the box.
8. Cut 3 pieces of 2"(W) by 32"(L) felt cloth as capillary mat/wick.
9. Cut 12"(W) and 24"(L) felt cloth as filter cover to be placed above the perforated plate.
10. Properly arrange the parts making it ready for planting.

# WOODEN GROWBED STAND WITH 20-LITER SIP BUCKET

- A Wooden Portable Raised Growbed. The raised bed is ideal for patios or small gardens and is a great way to grow your own food. It is made of palot-china wood.



# WOODEN GROWBED STAND WITH 20-LITER SIP BUCKET

- can provide easier gardening for the senior citizens or less agile. Once set up they are seriously labour-saving for everyone. Ergonomically designed, no need to bend.

# WOODEN GROWBED STAND WITH 20-LITER SIP BUCKET

- With them you can create an intense growing area filled with disease and weed free compost with just the right amount of fertilizer. That means you can start your plants in the best possible medium, and grow them closer together.

# TOOLS AND MATERIALS NEEDED:

**Tools:** Meter, Square, Straight edge, Saw, Hammer

**Materials and Costs:**

## **Wooden Growbed with Stand Assembly**

6 pieces pre-cut 1"x6"x14"	@ PhP 80/pc	PhP 480.00
6 pieces 1"x6"x17" wood for sides	@PhP 80/pc	PhP 480.00
4 pieces pre-cut 2"x1.5"x30" wood for posts	@ PhP 85	PhP 340.00
2 pieces of pre-cut 1"x2"x13" wood for bottom support	@ PhP 40/pc	PhP 80.00
2 pieces pre-cut 1"x2"x11" wood for bottom support	@ PhP40/pc	PhP 80.00
4 pieces pre-cut 1"x4"x14" for bottom platform	@ PhP50/pc	PhP 200.00
¼ kilo of 2" nails		PhP 140.00
<b>Total:</b>		<b>PhP 1,800.00</b>

## **TOOLS AND MATERIALS NEEDED:**

### **20-liter SIP Bucket Assembly**

20-liter bucket with overflow	@ PhP 300/pc	PhP 300.00
Perforated plate 11"-diameter plastic hollow sheet	@ PhP 200/pc	PhP 200.00
12"-diam felt cloth filter	@ PhP 200/pc	PhP 200.00
3 pieces 1 ½" by 12" capillary mat/wick	@ PhP 200/pc	PhP 200.00
10 pieces 2 ½" length PVC pipes perforated for plate support	@ PhP 200/set	PhP 200.00
1 pc 4"-diameter perforated PVC pipe 30" long	@ P100/pc	PhP 100.00

**Total: PhP 1,200.00**

**TOTAL COST FOR ONE TRAINING: PhP 3,000 x2 assembly units: PhP 6,000.00**

## PROCEDURE:

### **Wooden Growbed with stand**

#### *Left and Right 17"-sides of the growbed*

- a. Arrange and make the 3 pieces of pre-cut 1"x6"x17" as walls and the 2 pieces of 2"x1.5"x30" as posts. Nail them to make the left 17"-side.
- b. Set, align and nail the pre-cut 1"x2"x 13" bottom platform support at the bottom and inside the left 7"-side of the growbed.
- c. Make the same steps for the right 17"-side of the growbed.



## PROCEDURE:

### *Front and back 14"-side of the growbed*

- d. Nail the 3 pieces of pre-cut 1"x6"x 14" with the left and right 17"-sides of growbed. Make sure that the 1"x2"x11" bottom platform support is nailed inside and aligned to the bottom 14"-front side of the growbed.
- e. Make the same steps for the 14"-back side of the growbed.

## PROCEDURE:

### *Bottom of the growbed*

- f. Properly set the 4 pieces of pre-cut 1”x4”x14” wood above the bottom flatform support of the growbed.
  
- g. Secure them by nailing them on the flatform support.

Optional: Place Rollers on the 4 posts.

## PROCEDURE:

### *20-liter SIP Bucket Assembly*

- a. Bore  $5/16$ " hole at  $2 \frac{1}{2}$ " distance above the bottom of the bucket
- b. Make an 11" diameter plastic hollow sheet plate and perforate small holes on it.
- c. Cut 3 pieces of  $1 \frac{1}{2}$ " by 12" Capillary mat to be inserted in the plate.
- d. Make a 12" diameter felt cloth filter.
- e. Cut  $2 \frac{1}{2}$ " –height 3"-PVC pipes and perforate for plate support.

# TOWER GARDEN

The Tower Garden is a cylindrical growing container that can accommodate at least fifty plants but requires only four

square feet of surface. Raised gardening is easy on bad knees and backs, and best of all there's no weeding.







**Each Tower Garden incorporates built-in worm composting.**

**The core of each tower is a perforated column into which kitchen scraps are placed.**

**Inside, African Night Crawlers (ANC) leave nutrient-rich worm castings in their wake.**

**A 3" water reservoir at the bottom with capillary mat keeps the root zone wet. The overflow at the side bottom of the tower, allows the owner to capture the "worm tea" and pour it again in at the top.**



**Over time, the potting mix becomes increasingly rich in organic nutrients.**

**The warm, nutritious soil inside the Garden Tower hastens plant growth.**

**The Tower Garden is for gardeners who want an enhanced, easy gardening experience but also for people who need improved food security in their lives, such as city dwellers whose gardening options are extremely limited.**

# TOOLS & MATERIALS NEEDED

## **Tools/Equipment:**

High Speed Sewing Machine

Pair of scissors

Meter

Square

Straight Edge

Saw

Hammer

Cordless Drill and drill bits

Riveter set

Heat gun

Glass Bottle

Soldering gun

# Materials and Costs: Tower Garden Assembly

## *Tower Garden Wooden Stand*

- |   |                                    |            |
|---|------------------------------------|------------|
| a. 4 pcs wood for posts                       | - 2" x 3" x 12" @ PhP 72/pc x 4Pcs | PhP 288.00 |
| b. 4 pcs plank of wood<br>for outside support | - 1" x 4" x 18" @ PhP 72/pc x 4Pcs | PhP 288.00 |
| c. 2 pcs plank of wood<br>for inside support  | - 1" x 4" x 18" @ PhP 72/pc x 2Pcs | PhP 144.00 |
| d. 2 pcs plank of wood<br>for top support     | - 1" x 4" x 18" @ PhP 72/pc x 2Pcs | PhP 144.00 |
| e. 2 pcs plank of wood<br>for top support     | - 1" x 4" x 12" @ PhP 68/pc x 2Pcs | PhP 136.00 |



# Materials and Costs: Tower Garden Assembly

## *Tower Barrel Assembly*

a. 40 gal or 50 gal drum	@ PhP 1,000/pc:	PhP 1,000.00
b. 4"-diameter PVC perforated pipe w/ coupling and cover - 4" x 60"	@ PhP 700/set:	PhP 700.00
c. 10 pieces 3"-diameter cut pipes at 2½" length perforated for plate support	@ PhP 200/set:	PhP 200.00
d. 20"-diam Plastic hollow perforated sheet	@ PhP200/pc:	PhP 200.00
e. 20"-diam felt cloth filter	@ PhP200/pc:	PhP 200.00
f. 8pcs capillary wicks 1½" x 8"	@ PhP200/set:	PhP 200.00
g. Gasul for heatgun	@ P1,000/container:	PhP 1,000.00

TOTAL COST for one training: PhP 4,500.00

# PROCEDURE:

## *Tower Garden Wooden Stand*

- a. Cut 4 pcs of 2" x 3" x 12" wood for posts.
- b. Cut 4 pcs of 1" x 4" x 18" plank of wood for outside support.
- c. Cut 2 pcs of 1" x 4" x 18" plank of wood for inside support.
- d. Cut 2 pcs of 1" x 4" x 18" plank of wood for top support.
- e. Cut 2 pcs of 1" x 4" x 12" plank of wood for top support.

# PROCEDURE:

## *55 gal or 40 gal drum*

- a. Bore a 5/8" overflow hole at 2 1/2" distance from the bottom of the drum.
- b. Use that hole a reference line to make the 1<sup>st</sup> level of 10 slots at a distance of 5" above the reference line.
- c. Cut a 10 (ten) 4"-slit around the first level line at equal distance.
- d. Make the 2<sup>nd</sup> level of 10 slots line at 5" above the 1<sup>st</sup> level line.
- e. Cut a 10 (ten) 4"-slit around the 2nd level line at equal distance but move slightly to the right.

# PROCEDURE:

## *55 gal or 40 gal drum*

- f. Make the 3<sup>rd</sup> level of 10 slots line at 5” above the 2<sup>nd</sup> level line. Cut ten 4” slits, making sure that the slits are aligned with the 1<sup>st</sup> level line.
- g. Make the 4<sup>th</sup> level of 10 slots line at 5” above the 3<sup>rd</sup> level line. Cut ten 4” slits, making sure that the slits are aligned with the 2<sup>nd</sup> level line.
- h. Make the 5<sup>th</sup> level of 10 slots line at 5” above the 4<sup>th</sup> level line. Cut ten 4” slits, making sure that the slits are aligned with the 3<sup>rd</sup> level line
- i. Use heatgun and glass bottle to create plant hole in each 4”-slit.

## *Worm Composter*

- a. Cut a 4” diameter hole at the bottom of the drum.
- b. Cut a 4”-diameter PVC pipe to 5 feet or 60 inches. Perforate 3/16” around the pipe.
- c. Insert the 4”-PVC cover in the 4”- hole at the bottom of the drum and connect the 4”-PVC coupling. Apply vulcaseal around the sides of the hole to prevent possible leaks.
- d. Connect the 5ft, 4”-diameter perforated pipe.

## *Sub-Irrigated Assembly*

- a. Cut 2", or 3" or 4" pipe at 2 ½" length as drainage cells or divider support (to create high volume internal void that captures high water volumes). Fill up the bottom of the drum with these cut-pipes.
- b. Cut the hollow sheet divider/plate and make a 22"-diameter circle. Perforate the surface of the divider/plate with tiny holes. Make a 4" diameter hole at the center of the divider/plate.
- c. Cut a 24"-diameter felt cloth to cover the divider/plate and also act as capillary mat that will keep the root zone moist. Slit a 4" cross at the center of the felt cloth.
- d. Insert the divider/plate and the felt cloth in the 4"-perforated pipe.
- e. Place the tower garden on the wooden stand.



# LIVING WALL

## Rare Natural Beauty

Beyond its air-cleaning ability, the **Living Wall** is a unique and beautiful addition to any space, bringing the vivid beauty of a lush green garden indoors and improving the quality of life of those around it. The plant wall literally adds life to the room, imparting a soft, warm natural feel to your indoor space. People will marvel at this unique addition to your décor.



# Benefits of the Living Wall

- Substantially improves indoor air quality naturally
- Increases indoor oxygen levels
- Reduces energy consumption
- Significant cost savings
- Unique and beautiful addition to décor
- The look and feel of a green, lush garden in a vertical space







- **Easily Customizable**

*Living Walls* can be easily customized in size and shape to suit the needs of your spa, office, treatment area, or home. They make a great addition to any environment, presenting a focus on health and nature to your clients.

- **Naturally Clean Air**

This vertical garden is as smart as it is beautiful. The Living Wall System cleans the indoor air naturally by drawing it through a plant-covered wall and returning it fresh and clean to the room.

Integrated into your building's ventilation system, a wide range of plants, flowers, and foliage actively breaks down pollutants into their benign constituents of water and carbon dioxide. Clean air is then distributed throughout your space, significantly enhancing the indoor environment. The air is cleaned through completely natural means using processes without any artificial chemicals or filters.



Poor indoor air quality can increase breathing and other respiratory problems in people who spend most of their time indoors. **The Living Wall** removes up to 90% of common pollutants, significantly improving indoor air quality and improving oxygen levels in an environmentally sustainable manner. The improvement in air quality is immediately apparent and the cost savings can be quite significant.



# Tools/Equipment:

- High speed sewing machine
- Meter
- Square
- Straight edge
- Saw
- Hammer
- Cordless drill and drill bits
- riveter set
- plier stapler and staples
- tack gun
- heatgun
- scissors/cutter,

# Materials and Costs: Living Wall Assembly

- Sewn felt cloth (30 pockets) - 36" x 36" @PhP 500/pc
- plastic hollow sheet - 36" x 36" @ PhP 200/pc
- wood plank - 1"x4"x 36" @ PhP 100/pc
- pre-cut U-plastic downspout - 1 1/2 " x 2" x 36" @ PhP 200/pc
- male and female adapter with rubber gasket - 1/2" diameter @ PhP 50/set
- 16mm polytube - 90" or 3 yds length @ PhP 20/yd
- Drippers - 10 pcs @ PhP10/pc
- U-nails, Threads, plastic gasket, 16mm plugs - assorted @ PhP 290/set

**TOTAL Cost per Living Wall set: PhP 1,500.00**

3 sets in one training: PhP 1,500 x 3: PhP 4,500.

# PROCEDURE:

## LIVING WALL

- Cut 1" x 4" x 36" plank of wood for top support.
- Cut 36" x 36" plastic hollow sheet

## Felt Cloth

- Cut 36" x 72" felt cloth to make 36"x36" felt cloth living wall.
- Sew the felt cloth to make 5 vertical lines and 6 horizontal lines to make a total of 30 pouches or 30 plant holes.
- Attach the hollow sheet and the felt cloth using plier stapler

## Irrigation system

- Prepare the pre-cut U-plastic downspout and fold the ends using heatgun to make a 36"-length water catcher.
- Put the ½" male and female adapter pipe in the downspout for overflow
- Attach the hollow sheet and U-plastic downspout using riveter
- Attach the wood top support above the hollow sheet and felt cloth for irrigation system using U-nails
- Secure the 16mm polytube and drippers and other fixtures to complete the irrigation system.