



**ECO-MESH**

**Low Impact Develop (LID)  
Stormwater Management and Solution**

**Green Infrastructure**

**Sub-irrigated Raised Beds - Green Roof**



*Green Roof*  
*SMP-Square Mesh Pipe*

*Water Harvesting Self Watering Wicking Bed*



*Green Roof*  
*AMP-Arched Mesh Pipe*  
*Sub-Irrigated Raised System*

# Green Infrastructure

## Sub-irrigated Raised Beds - Green Roof

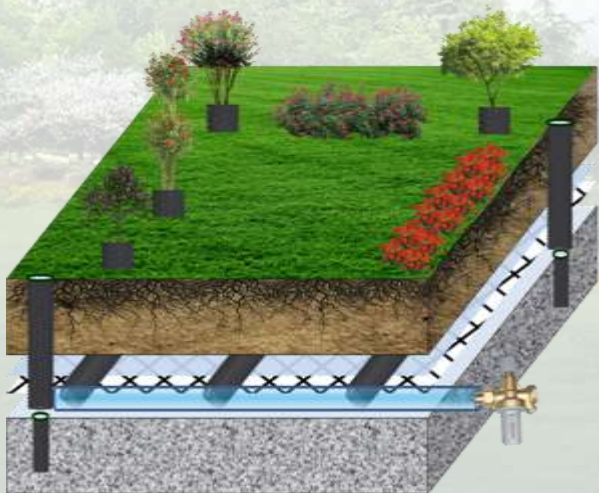
*Mitigation heat island effect, slow surface runoff, water saving irrigation and drainage facilities.*



*Root Watering Bed Illustration*



*SMP-Square Mesh Pipe-Green Roof*  
*Water Harvesting Self Watering Wicking Beds*



*AMP-Arched Mesh Pipe-Green Roof*  
*Sub-Irrigated Raised System*



*Root Self-Watering Bed*  
*Green Roof and balcony*



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## **Low Impact Development (LID) Stormwater Management and Solution**

# **Square Mesh Pipe-Green Roof Water Harvesting Self-Watering Wicking System**



# SMP-Square Mesh Pipe

## Water Harvesting Self-Watering Wicking System

### Water Harvesting From **Green Roof** + **Blue Roof** + **Wicking Beds**



*All Features in One System: Green Roof + Blue Roof + Wicking Beds*

*20cm height Square Mesh Pipe can store **200mm rainfall***



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# Water Harvesting Self-Watering Beds

**Water conservation is the use of plant roots to the water characteristics of planting, so that plant roots grow in the water, during the growth of plants will not be too much water or poor water growth, plant water absorption, healthy, fast and easy management.**

**The Plant roots must be planted by soil, through the air layer, so that the roots of breathing, and then into the water.**



**Root Watering Bed**

# Water conservation cultivation - Method



# *Water conservation cultivation - Example*



# *Water conservation cultivation - Example*







# *Water conservation cultivation - Example*



# *Water conservation cultivation - Example*



# *Water conservation cultivation - Example*



# *Water conservation cultivation - Example*









# Water Harvesting Self-Watering Wicking System



## Water Harvesting Self-Watering Wicking System Features

Surface runoff and flooding reductions:  $\frac{1}{4}$  of the water retention system area can store 50mm rainfall.

Water-saving irrigation: Sub-irrigation can save 50 to 85% of water and more than 60% of labor.

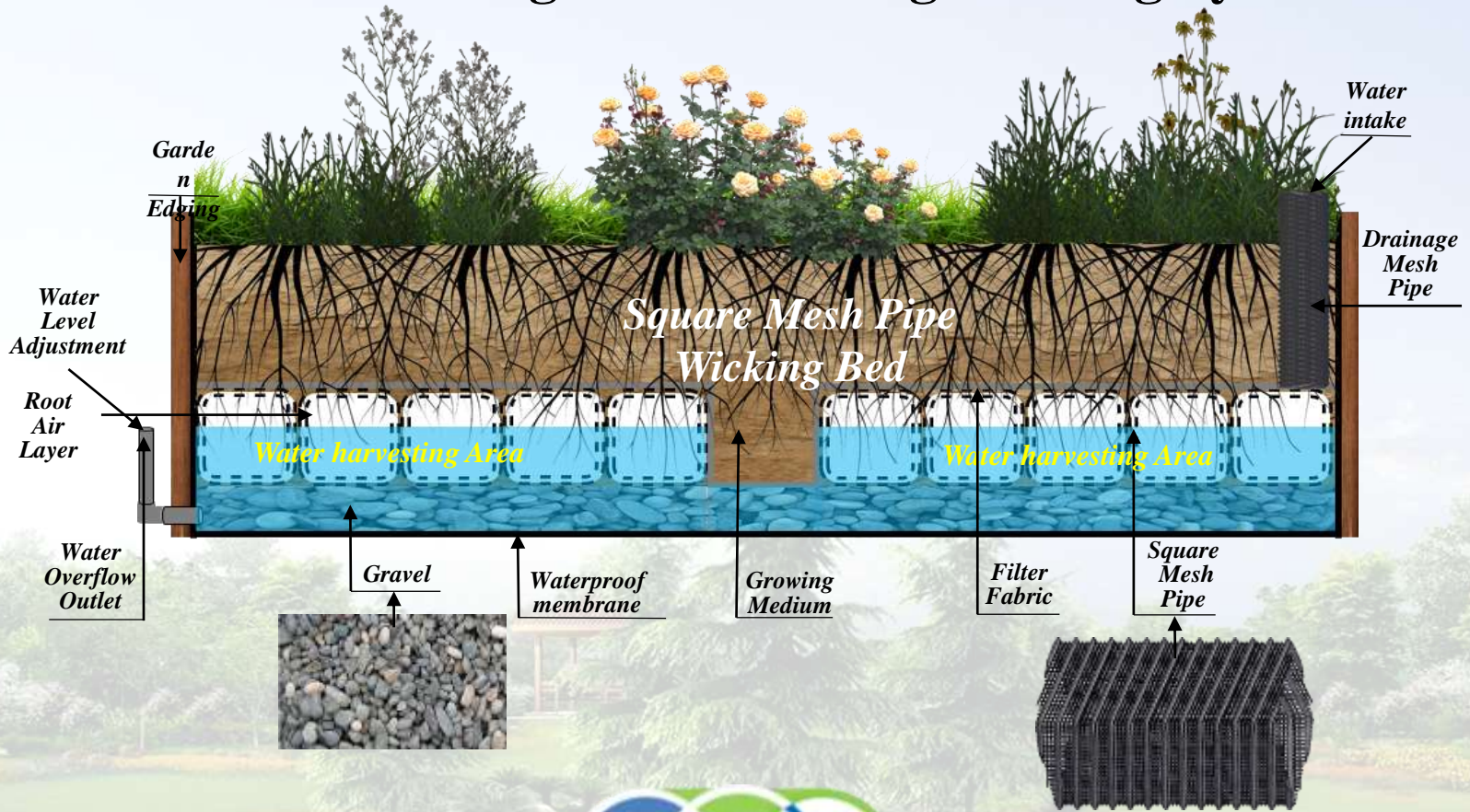
A comfortable environment for plant growth.

Applications: landscaping, planting and etc.



# SMP-Square Mesh Pipe

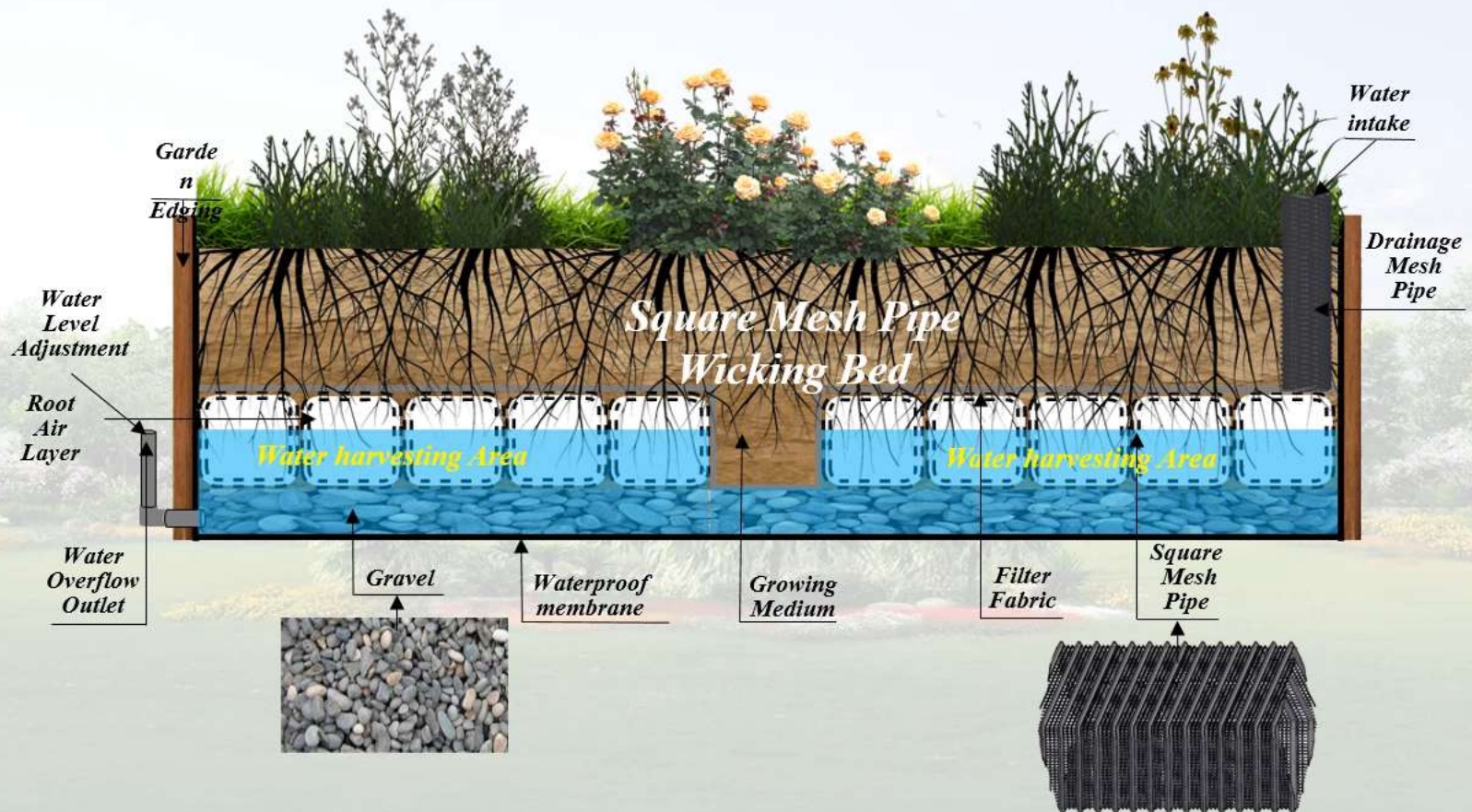
## Water Harvesting Self-Watering Wicking System





# SMP-Square Mesh Pipe Self Watering Wicking Beds Green Roof Installation Steps

## SMP-Square Mesh Pipe-Green Roof Water Harvesting Self-Watering Wicking System



# Water Harvesting Self-Watering Wicking System

## What is a blue roof?

A blue roof can temporarily collect storm water and release it slowly after the rain. It can act like a buffer to release the water. It can be combined with sewer system and be the buffer between the sewage system and storm water in case the system is overwhelmed by the heavy rain. In addition, the blue roof can significantly reduce the building cooling costs. To provide more cooling, some systems spray the stored water back on the roof. The stored water can be used for landscaping, green roof and etc.



## What's a Wicking Bed?

A garden bed can hold water at the bottom with a waterproof lining. Water can wick upward to the surface by capillary action. It can work like a self-watering pot with decorations. It can utilize water efficiently without the waste of evaporation and all the water can be used by the plants. It can maintain the consistency of the soil moisture and temperature which are the key factors for plants to grow.



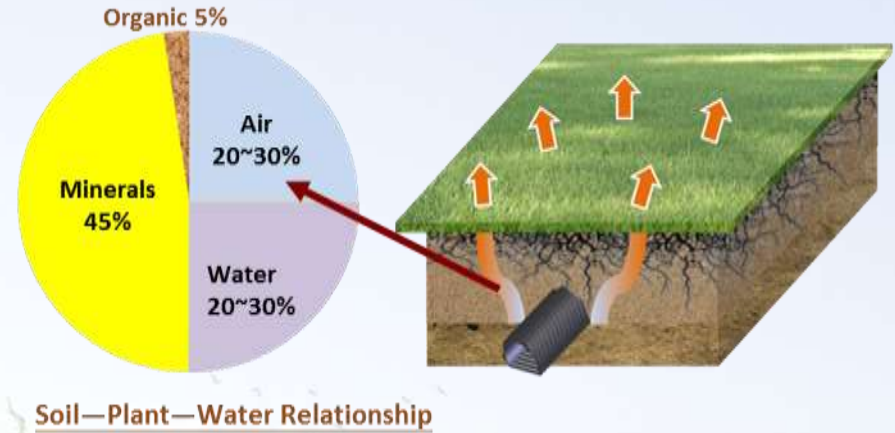
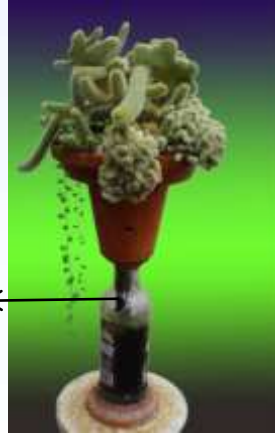


# SMP-Square Mesh Pipe

## Water Harvesting Self-Watering Wicking System



→ Root Air Layer  
for plant growth ←



### Why Wicking Beds Install Mesh Pipe?

Root cannot breathe when the soil is saturated with water.

Mesh Pipe provides the Air Layer to allow the roots to breathe and grow.

Soil **ventilation** supports the microbial activity required for plant growth.

Ventilation  
Roots Air Layer  
For Plant growth



# Water Harvesting Self-Watering Wicking System

## Advantages of Water wise wicking beds versus conventional growing

- Uses 50-85% less water than a conventional garden bed.
- Large reservoir of water reduces the need for watering frequency.
- Soil moisture and temperature can be maintained all the time.
- Save watering and maintenance labor costs.
- Can be installed at most of the places even where the plants are hard to survive.
- The plants are easier to survive during intense weather conditions.
- Can be directly connected to a water tank without the pressure pump.
- Minimize water wastage and reduce the chance of fungal disease.
- Minimize evaporation with thick mulching and improve soil life (no salt in soil).
- Reduce the chance of weeds establishment with the drier surface covered with mulch.
- Tree roots can grow into the soil and penetrate into wicking beds.
- Increase the efficiency of the drainage when there's heavy rain.
- Can be built on top of poor soil, small or concreted gardens.
- Temperature consists better than normal garden beds, allowing plants to grow faster in spring and longer in autumn.
- Ideal for heavy feeders and quick climbers, such as corn, pumpkin, cucumbers and gourd.
- Can be adapted for aquaponic systems, where the water is constantly flowing in the gravel filled reservoir.



# Wicking Bed Depths

## Turf: 15 To 20 cm

Small wicking tubs with just 15 to 20 cm of soil above the water reservoir are ideal for growing seedlings for transplanting. At this depth the osmotic process draws moisture right to the surface of the soil, providing ideal conditions for growing grass for transplanting.

## Vegetables : 35 To 40 cm

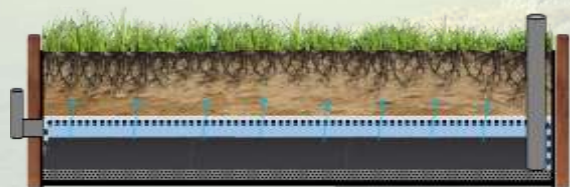
Wicking beds or tubs with 35 to 40 cm of soil above the water reservoir provide a suitable height for growing vegetables. At this height the soil on the surface is fairly dry but allows all but the smallest seedlings to reach the moist area just below the surface with relative ease.

At this depth there is not only enough room for the vegetable roots to develop properly the drier soil on the surface reduces the number of weed seeds that germinate.

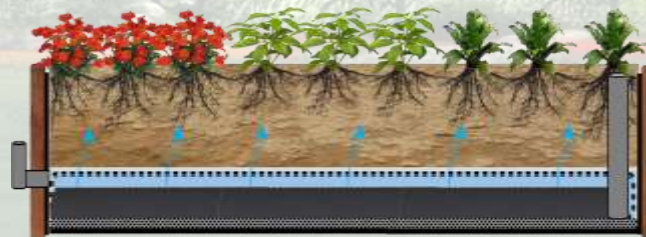
## Small Trees & Shrubs : 50 Plus cm

Wicking beds or tubs with a soil depth of 50 or more cm are ideal for growing small trees or shrubs. At this depth the surface soil is very dry, inhibiting weed growth, while the greater volume of soil provides more room for roots to grow.

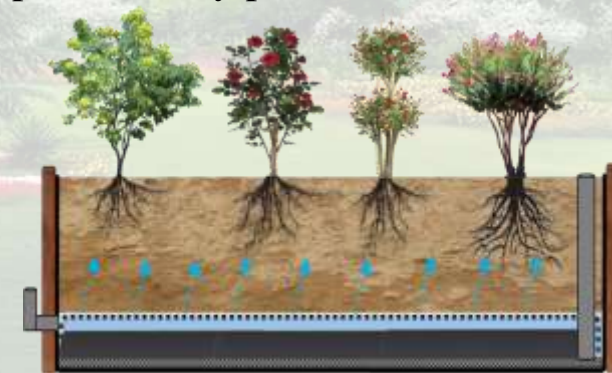
Wicking tubs of this depth are ideal for growing small trees in a vegetable patch as they prevent the roots from competing directly with nearby vegetables.



Shallow wicking beds with a soil depth of around 15 to 20 cm draw the water to the surface of the bed providing ideal conditions for growing grass for transplanting.



Wicking beds with a depth of around 35 to 40 cm depth are suitable for growing vegetables.



Deep wicking beds with a soil depth of 50 cm or more are ideal for containing small trees and shrubs.

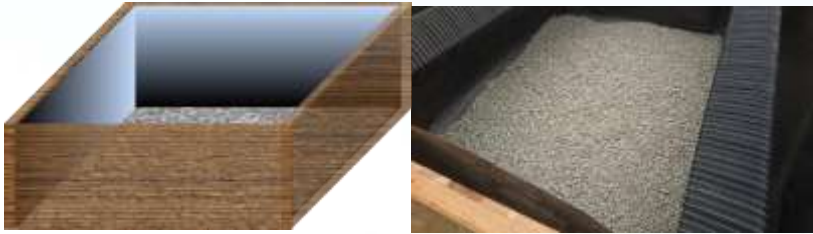
# Water Harvesting Self-Watering Wicking System Installation Steps



**1. Assemble garden edges**



**2. Cover water membrane inside the garden edges**



**3. Lay 5cm Gravel on bottom**



**4. Lay one 4" AMP-Arched Mesh Pipe and 20cm SMP-Square Mesh Pipes**



**5. Lay textile fabric over mesh pipes**



**6. Install a mesh drainage pipe vertically as the water inlet and a water overflow pipe**



**7. Fill with growing medium**



**8. Plant and vegetation**



**ECO-MESH**

*Low Impact Development  
Stormwater Management and Solution*

***Green Roof + Blue Roof***  
***AMP-Arched Mesh Pipe***  
***Sub-Irrigated Raised System***



***AMP-Arched Mesh Pipe  
Sub-Irrigation Raised System***



### Green Roof

Green roofs are made up of a top vegetative layer that grows in an engineered soil, which sits on top of a drainage layer. A green roof can be intensive, with thicker soils that support a wide variety of plants, or extensive, covered in only a light layer of soil and minimal vegetation.

### Blue Roof

Blue roofs are designed without vegetation for the primary purpose of detaining stormwater. Weirs at the roof drain inlets create temporary ponding and gradual release of stormwater.



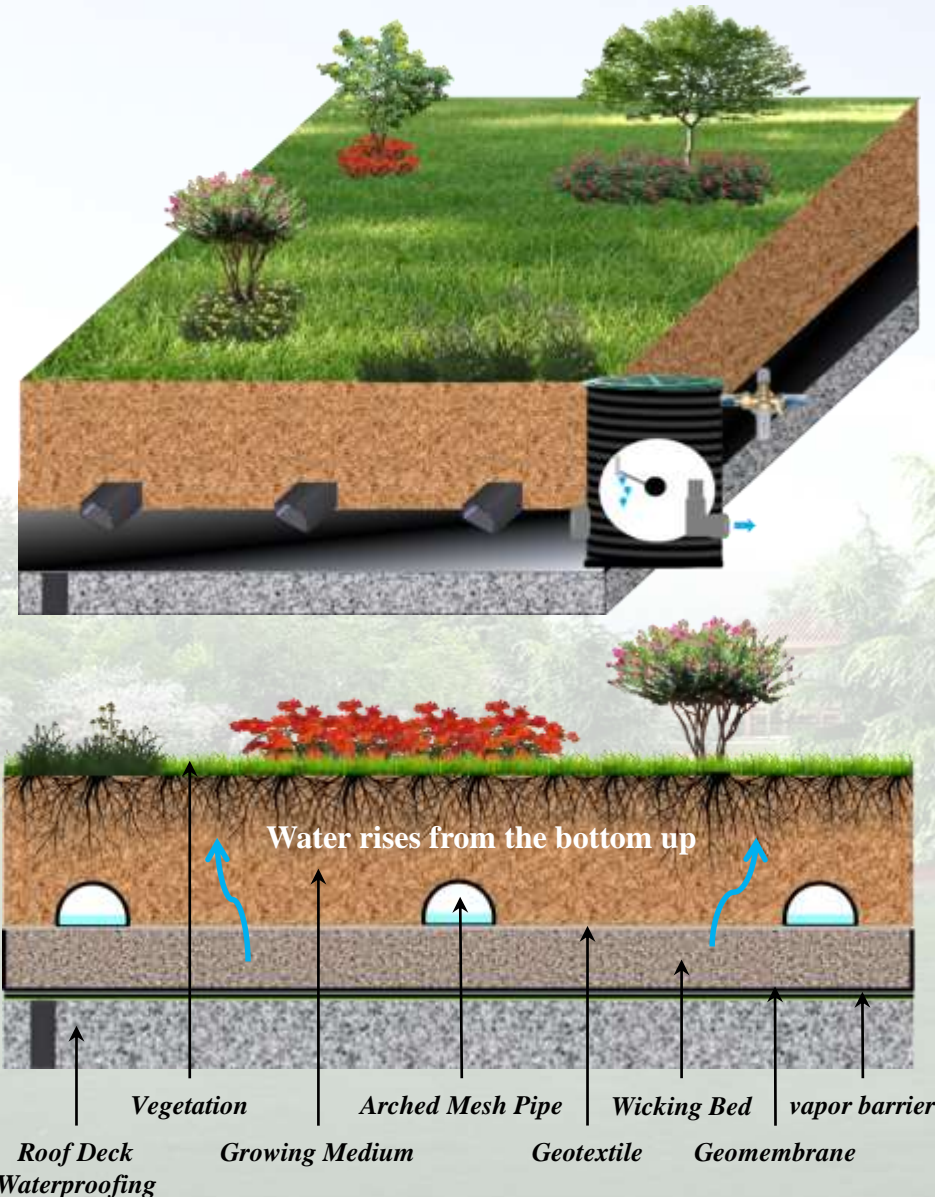
### Green Roof + Blue Roof



# Advantages of Green Roof Raised Bed

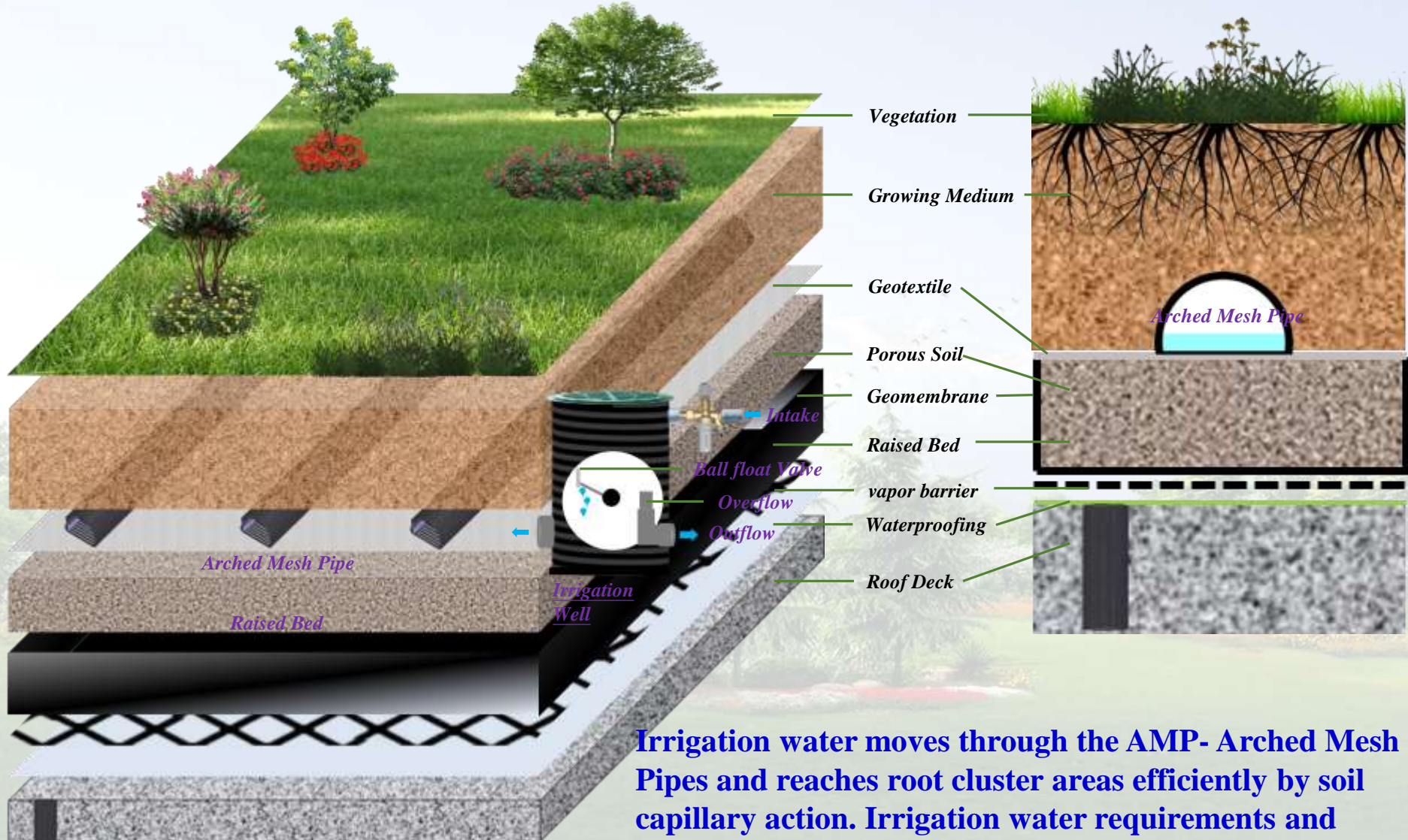
## Green Roof Sub-irrigated Raised Beds

- Water-efficient; use between 40 and 50% less water than a conventional garden bed.
- Watering from the bottom up prevents evaporation of surface water.
- Harder for weeds to establish as the soil on the surface is drier.
- Labor-efficient; they are self-watering, so it is possible to go away for two or three weeks without your garden bed drying out.
- Can be watered by a low pressure water system; it can be directly connected to a water tank without use of a pressure pump.
- They provide efficient and effective drainage during a large downpour.
- Large reservoir of water reduces the needs for frequent watering.
- Evaporation is reduced to a minimum with thick mulching
- Harder for weeds to establish as the mulch covered surface is drier.
- Soil life is improved. Nutrient is not lost to the subsoil when the garden bed is watered.
- No salting and evaporation; no minerals left behind in the soil.
- No permanent stale water; no mosquito larvae or anaerobic conditions.





# AMP-Arched Mesh Pipe Subsurface Irrigation and Drainage System Raised Bed of Green Roof Installation Illustration



Irrigation water moves through the AMP- Arched Mesh Pipes and reaches root cluster areas efficiently by soil capillary action. Irrigation water requirements and irrigation manpower are reduced, Plant growth increase are equivalent to reduce in fertilizer.



*AMP-Arched Mesh Pipe Subsurface Irrigation and Drainage System*

## **Raised Bed (Blue Roof) of Green Roof**



*Green Roof of Raised Bed*

*AMP-Arched Mesh Pipe System Provides Economical & Simple Installation and Maintenance*

# AMPS-Roof Garden irrigation & drainage

## Irrigation 、 Drainage 、 Ventilation 、 Retention

### AMPS-Roof Garden Installation Steps



*ECO Mesh Pipe Economical & Simple Solution - State Of The Roof: Green*



**ECO-MESH  
Water Solution**

**Low Impact Development (LID)  
Stormwater Management and Solution**  
*Rooftop Root Self-Watering Beds Example*



# ***Green Roof – Water Conservation Cultivation***

## ***Dimensional Cultivation with Root Self-Watering Beds***

### ***Green Roof and Balcony***

***Construction is simple, easy to maintain***



# Root Self-Watering Bed Cultivation - Example





# Root Self-Watering Bed Cultivation - Example





# Root Watering Beds Cultivation – Green Balcony



# Root Self-Watering Beds Cultivation – Green Roof













