

Purpose of the bio-filter

In times of drought that many farming families are experiencing in the Dry Tropics, harvesting all possible water and not wasting it are two measures that are necessary more and more.

Grey water from household bathrooms (showers and sinks) or laundries is often wasted, partly because it is contaminated by products like soap, shampoo and detergent.

With the bio-filter, this water can be decontaminated and used to water plants, trees or vegetables in summer.

The bio-filter must be built somewhere close to the kitchen, the laundry room and the bathroom, but a bit lower so that the water will reach it by gravity.



Step by step: Building the bio-filter



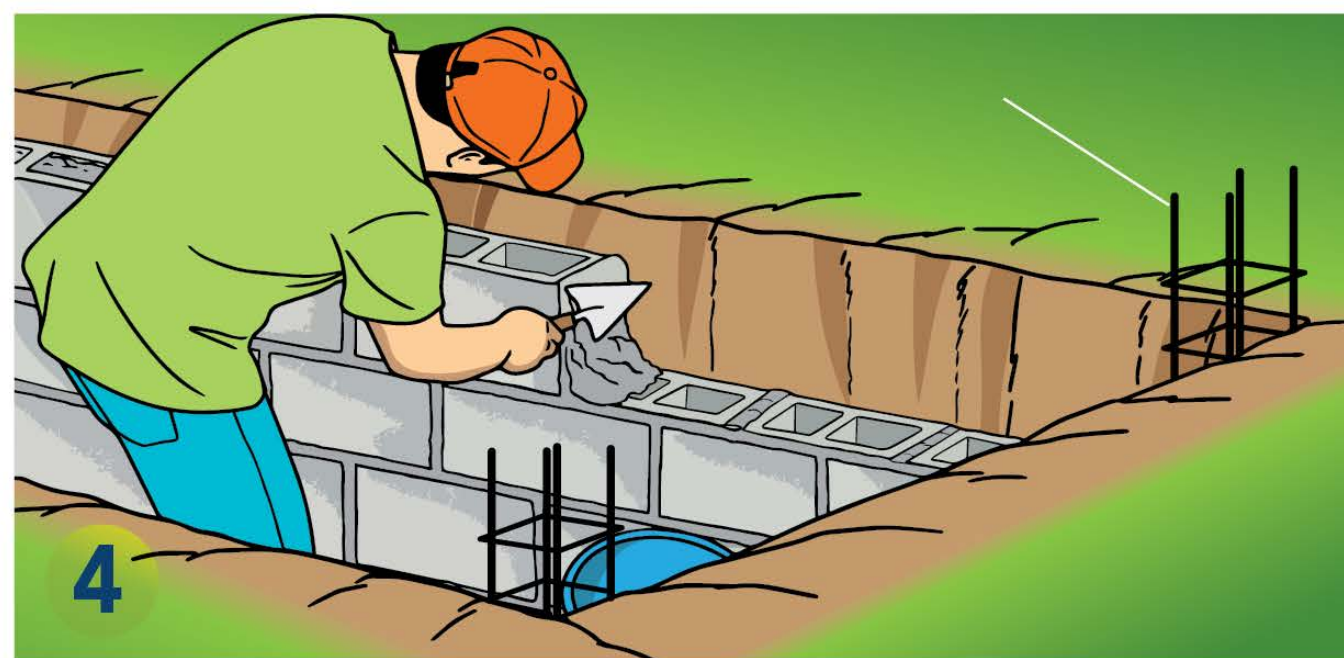
1 Dig a hole big enough to fit the filter, which is 4.5 metres long by 80 centimetres wide and 75 centimetres tall. The filter needs to have a 5% slope towards the outlet.



2 Bury the one-inch PVC pipe that runs from the laundry, bathroom or kitchen to the hole.



3 Prepare the capping beam with 3/8" rods.



4 Start building the walls of the four sides, with 6-inch blocks. Place the 3/8" rods as reinforcement on the four corner blocks.



5 On top of the last row of blocks, place the mould for the capping beam and fill with concrete.

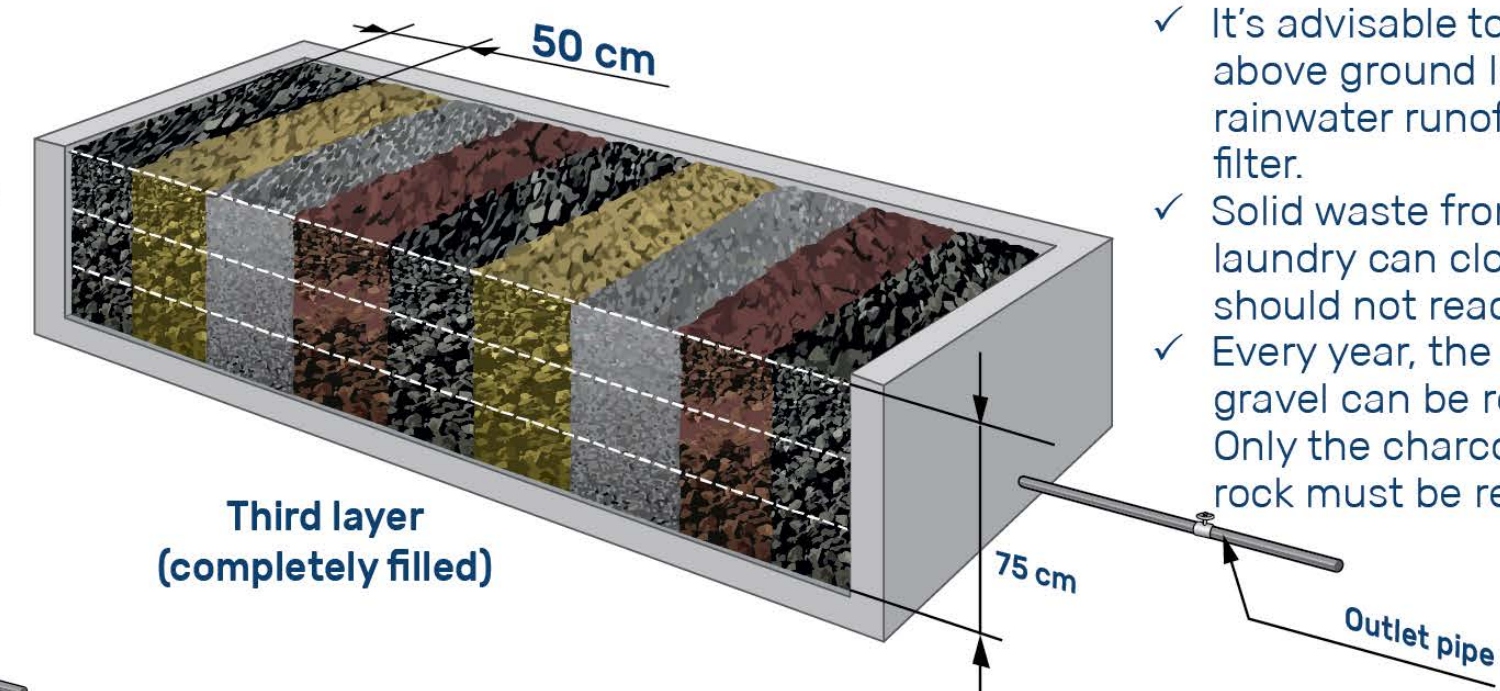
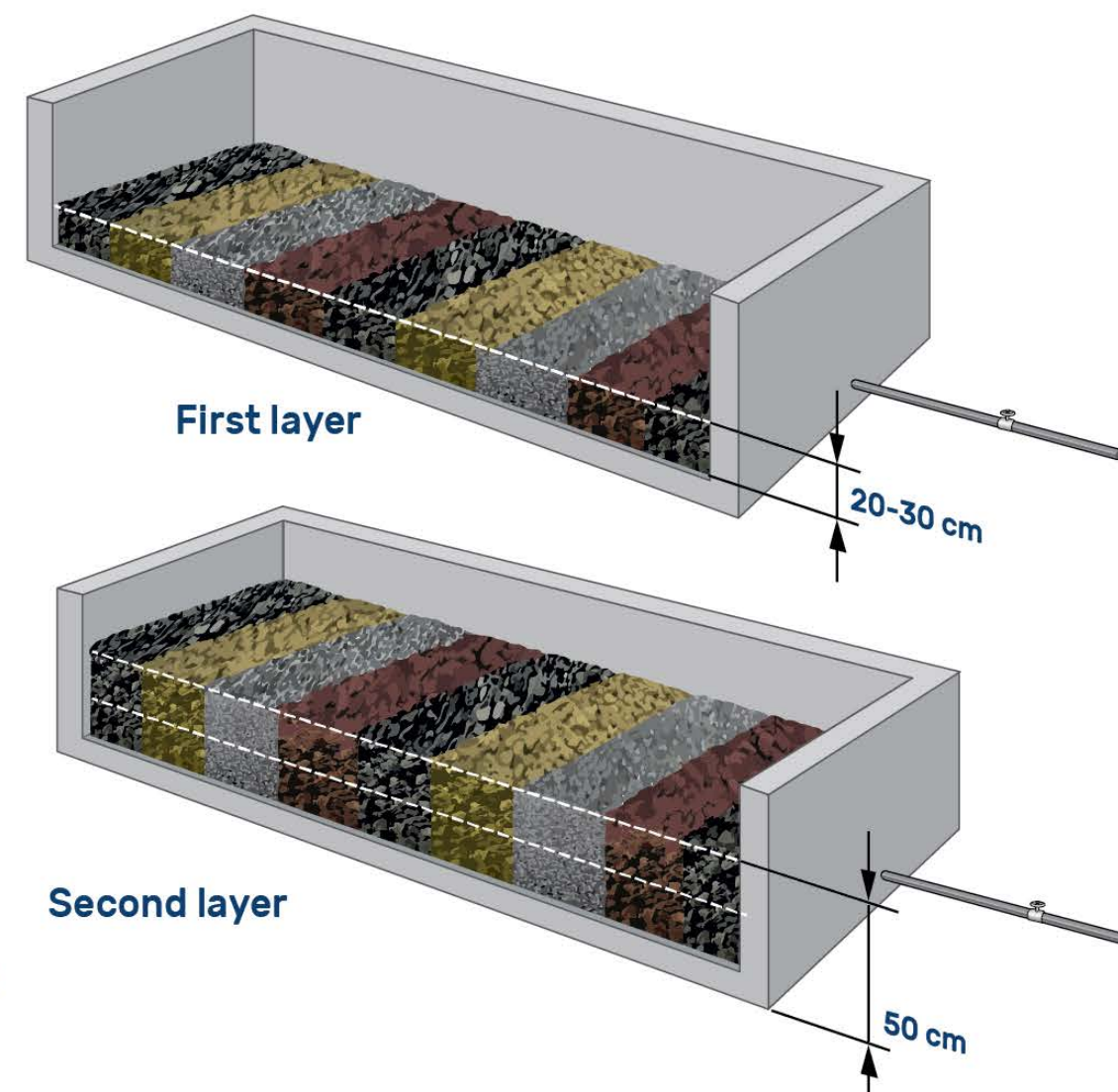


6 Compact the bottom well and fill with concrete to a 3-inch thickness. Plaster and smooth the walls and bottom of the basin. Let dry for two days, wetting the plaster occasionally so it won't crack.



- 8**
- Place a pipe at the filter outlet, one inch from the bottom, with a shut-off valve.
 - Fill the filter with the four materials to filter the water, following these steps:

- Make successive vertical layers 50 cm wide, starting from the side where the wastewater is coming from, using the materials in the following order: charcoal, red lava rock, fine gravel, pumice rock.
- When the fourth layer is finished, start over with another four layers and continue until filling the filter.
- Since you can't make each layer the full height of the filter (75 cm) at once because it would collapse, make each layer 20 to 30 cm high and then repeat until level with the surface of the basin.



Required materials

- For the construction of the filter basin:
 - ✓ 4 bags of cement
 - ✓ 90 x 6-inch blocks
 - ✓ 1 quintal (46kg) of 3/8" corrugated iron
 - ✓ 80 x column stirrups (10 x 10)
 - ✓ 1.5 pound of binding wire
 - ✓ 2 x 1-inch PVC pipes
 - ✓ 1 x 1-inch PVC shut-off valve
 - ✓ 2 x 1-inch PVC elbows
 - ✓ 2 x 1-inch PVC "Tee" connectors
 - ✓ 6 pounds of 3-inch nails
 - ✓ 3 boards, 1 x 12 x 6 (for the mold)
 - ✓ 1 cubic metre of sand
 - ✓ 1 x 55-gallon barrel

- To fill the filter:
 - ✓ 4 sacks of charcoal
 - ✓ 1 cubic metre of 1/2" fine gravel
 - ✓ 1 cubic metre of red lava rock
 - ✓ 1 cubic metre of pumice rock

- Tools:
 - ✓ 1 trowel
 - ✓ 1 shovel
 - ✓ 1 pickaxe or digging bar
 - ✓ 1 pair of pincers or pliers
 - ✓ 1 hammer

Recommendations

- ✓ If no one in the household knows about construction, it's better to hire a builder.
- ✓ It's better to build the filter during the dry season.
- ✓ It's advisable to place a row of blocks above ground level to prevent rainwater runoff from flooding the filter.
- ✓ Solid waste from the kitchen and laundry can clog the pipeline and should not reach the bio-filter.
- ✓ Every year, the red lava rock and fine gravel can be reused after washing. Only the charcoal and the pumice rock must be replaced.