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## A SIMPLE HOME DRIP IRRIGATION SYSTEM

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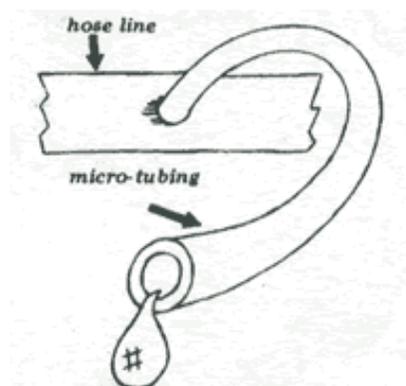
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Since water is often a limiting factor for gardening in the Virgin Islands, wise use of all available water is essential. We all use water in our homes, and -much of this water is lost. GRAY WATER is water that has been used for washing, and is no longer fit for human consumption, but is not contaminated by waste products. This water is often good for growing vegetables, fruits or ornamentals. The problem is, how does the average person collect, store, and utilize gray water without the major expense of changing the plumbing and building a gray water cistern? The answer is simple, inexpensive, and requires little construction.

Any water system has 3 major parts. A source of water (cistern), a pressurizing method (gravity or pumps), and a delivery system (pipes and faucets). This drip irrigation system is no exception, but is designed to be built with as little expense as possible. THE CISTERN IS A PLASTIC GARBAGE CAN. It can be any size or shape, depending on the amount of gray water you produce and how often you produce it. The only major requirement is that it be mosquito-proof. THE PRESSURE IS PROVIDED BY GRAVITY. Simply place the cistern about 5 feet above the area you wish to water.

THE DELIVERY SYSTEM is a commercially available drip irrigation line and micro-tubing emitters. (Do not use other types of emitters as gravity flow pressure works best with micro-tubing). The drip irrigation line is a 1/2" or 3/4" black plastic flexible tube. Inserted into it through holes in the line, are tiny plastic tubes called micro-tubing or "spaghetti-tubing". (see Fig. 1)



These tubes are so small that only a drop of water comes out at a time. This waters only the plant's roots and wastes almost no water by evaporation or over watering. A micro-tube runs from the hose line to each plant.

To assemble your system you will need the following materials and tools:

1. Heavy duty PLASTIC GARBAGE-TYPE CONTAINER with lid
2. DRIP IRRIGATION LINE (enough to run from cistern to opposite end of garden)
3. MICRO-TUBING with end weights (1 per plant)
4. Female END FITTING with small screen (for end of drip line)
5. 1/2" HOSE CLAMP
6. PLASTIC SEALING COMPOUND
7. Optional: CUT-OFF VALVE for drip line
8. SHARP KNIFE
9. SCREW DRIVER
10. DRILL (Optional)

Before assembling the system, DECIDE ON THE LOCATION of the cistern and garden. The cistern should be close to the door so that filling it will be easy. The garden level should be about 5 feet below the cistern, and not too far away. The line running from the cistern to the garden must be covered or buried to keep the water cool and to maximize the life of the line. The garden area itself should be relatively level for uniform watering to be achieved. The line should run within 18 inches of all plants. After you have decided where to locate your cistern and garden you can determine the amount of drip line you will need. (see Fig. 2)

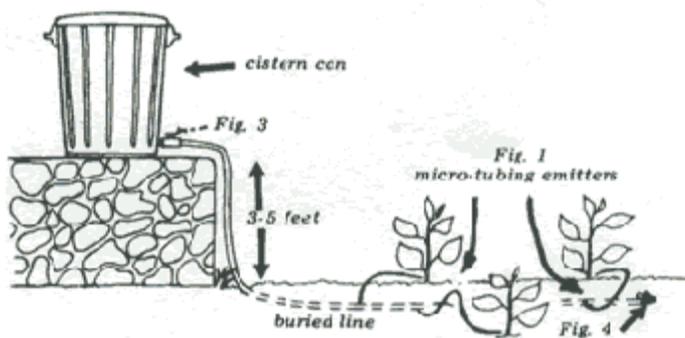


Figure 2 – Simple Grey Water Drip Irrigation System

To assemble, PUNCH OR DRILL A HOLE on the side of the cistern, about an inch above the bottom, to allow sludge to settle without plugging the line. The hole should be a little smaller than the drip line so that when it is pushed through, it fits tightly. APPLYING SEALER around the junction makes it watertight. The screened female END FITTING IS INSTALLED on the end of the drip line inside the cistern so that the shoulder is flush with the wall. (see Fig. 3)

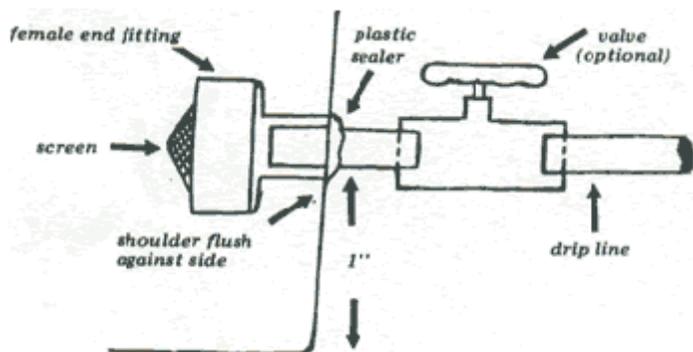


Figure 3 – Drip Line Fitting

Sealer applied around this fitting adds extra protection against leaks. The drip line is then run to the garden area (always in a down-hill direction), and buried along the way. The drip line end is crimped over and the HOSE CLAMP TIGHTENED on it to close the end. (see Fig. 4)

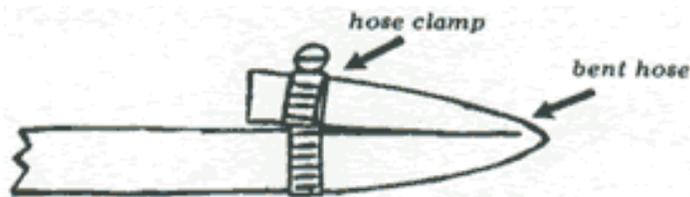


Figure 4 – End of Drip Line

A MICRO-TUBING EMITTER IS INSTALLED for each plant, following the instructions that come with it. Installation is easy, and generally consists of punching a hole with a tool

(provided with the micro-tubing) and inserting one end of the emitter into the drip line and running the other to the plant to be watered. A weight on the end of the emitter keeps it in place. The number of emitters is dependent on the number of plants your water supply can support. For instance, figure a pint of water twice weekly for a tomato plant. Use mulches to help “stretch” the availability of this water (see Gardeners Factsheet #5)

The optional CUT-OFF VALVE can be installed in the drip line near the cistern. (see Fig. 3). This is particularly advisable for persons who produce a large amount of gray water only occasionally, such as someone who washes clothes once a week. The water can then be held over a long period, and released a little each day.

Now that the system is installed where do you get the water supply? While fresh water can be used in the system, most people do not have sufficient supplies to use on plants. Water from washing dishes is the most convenient source for gray water systems. Just use dish pans and carry the cooled water to the cistern instead of dumping it down the drain. Water from automatic clothes washers can be used by attaching a garden hose to the pump-out and running it to the cistern. When not in use the hose is rolled up and tucked behind the washer. Wash water with strong detergents should be diluted with rinse water to lessen the possible build up of soil salts over a long period of time. The use of low phosphate detergents is recommended. When heavy amounts of chlorine bleach are used, leave the cover off the cistern for a few hours before opening the valve. The chlorine will then quickly evaporate and the water will be safe to use. For the purist, showering while standing in a bucket or wash basin will contribute, and can be the largest source of gray water for those without a washing machine.

With ingenuity anyone, even those living on boats, can save enough water for a few plants, while those with large families can keep an entire garden going.

This type of system for 8 tomato plants can be built for \$10 - \$15 and should last for 3 years, with care. Continued staggered replacement of plants can assure a steady supply of tomatoes, and soon pay for your system. Assuming 5 lbs. of tomatoes per plant, and 3 plantings per year over 3 years you could produce as much as 360 lbs. of tomatoes worth approximately a dollar a pound retail. This savings on the food budget is in addition to the generally higher quality of home grown produce. Almost any type of plant can be grown with this system, and different types can be mixed. Even ornamentals or plants in pots can be watered this way.

To increase the convenience value of this type of system, and to assure top yields, a balanced soluble fertilizer can be added to the water in the cistern so the plants are continually and easily fed. Look for a soluble fertilizer such as 10-10-10 or 20-20-20 and follow the instructions on the package.

A gray water drip irrigation system is easy and inexpensive to build, saves precious water, is convenient to use, and helps your garden produce more money-saving homegrown vegetables.